A Report on the Excavation of an Ancillary Area (Site 18FR320) of the Historic Ironworking Complex at Catoctin Furnace, Frederick County, Maryland

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State Highway Administration,
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by

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ABSTRACT

The site at 18FR320, Catoctin, Maryland was initially identified during a survey carried out in 1977 in advance of the dualization of U. S. Route 15. Excavations were conducted in 1979 and 1981 in order to mitigate expected adverse effects by recovering significant data contained within the site.

The results of the excavations revealed that several phases of activity had taken place on the site. A raceway running west to east was the earliest feature. Following the silting up of the raceway, the site became the disposal area for ironworking waste, specifically slag identified metallurgically as deriving from the refining of iron, and gate metal deriving from the casting of iron. Contemporary with this phase was a structure postulated to serve as a charcoal house for the refining forge, located off the site probably to the east.

A later structure is of uncertain function, but may be equated with a historical reference to a warehouse in the vicinity of the site. In a still later phase, a stone revetted earthen storage dam was built to the north of the site. Finally, in the last period of activity, a driveway to the Auburn Mansion ran across the northern part of the site.

Area excavation of these features and layers revealed artifactual evidence of the kinds of molding and casting practices which took place at Catoctin, as well as of the finishing and assembling of the cast iron artifacts, particularly stoves and hollow ware.

ACKNOWLEDGMENTS

An involvement that has lasted over as many seasons as that with site 18FR320 has incurred many debts of assistance and kindness. Although some specific names have been forgotten or were never known, our appreciation and thanks remain.

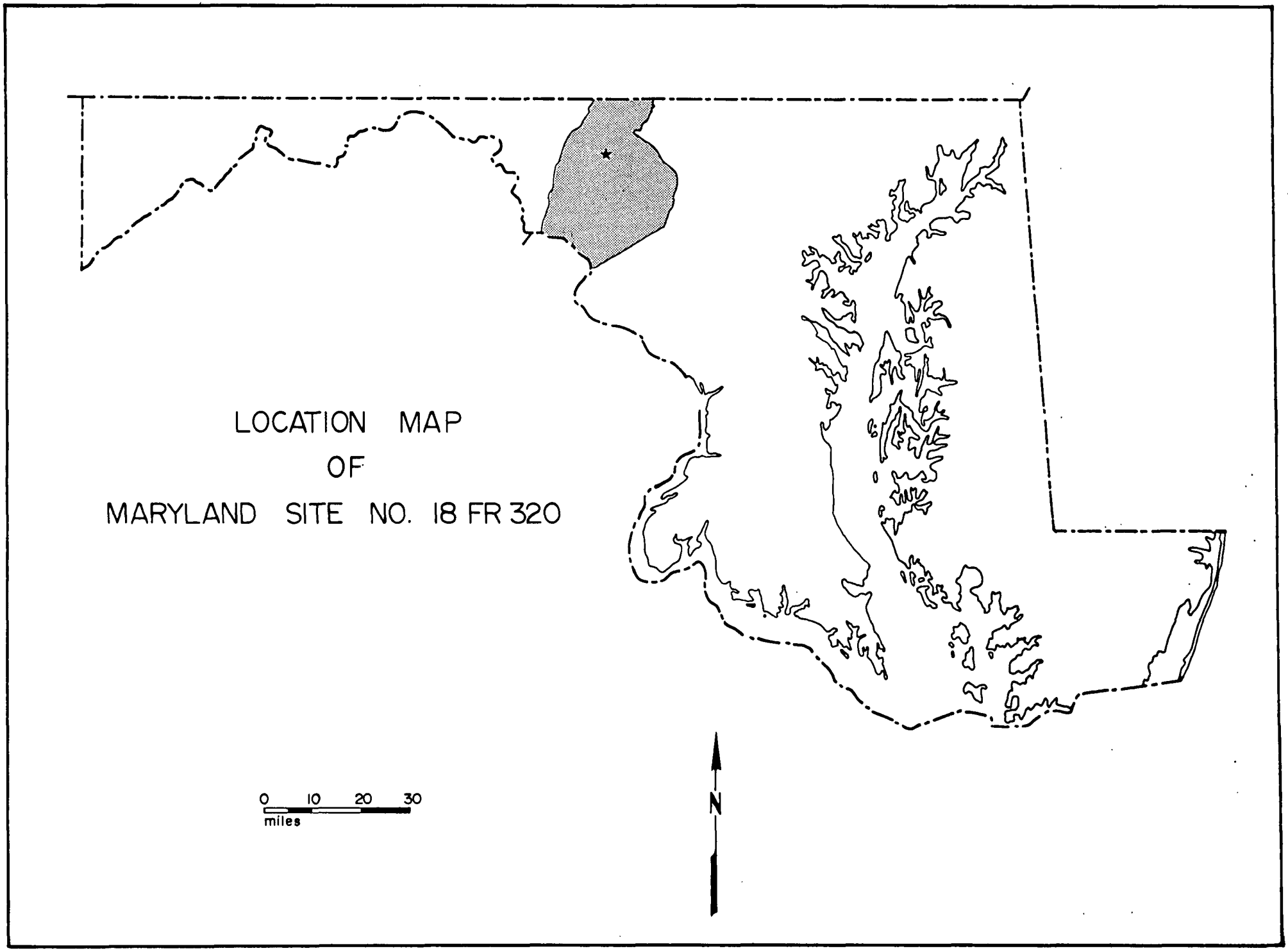
Persons who contributed to the success of the 1981 field season included the field workers: Kenneth Joire, Georgia Vichos, Steven Yuresko, and Karyn Zatz who were most productive and good-humored under trying field conditions; Tyler Bastian, State Archeologist, Maryland Geological Survey, Division of Archeology, who made a number of site visits and arranged for the excavation to be advertised through the Archaeological Society of Maryland which led to the involvement of some volunteers from that organization. Those volunteers are to be thanked, as are a number from Montgomery College. Dennis C. Curry, Maryland Geological Survey, Division of Archeology, provided invaluable assistance and coordination throughout the project. Edward Feaser, Resident Maintenance Engineer, State Highway Administration, was most helpful in arranging for removal of trees from the site as well as the Auburn Mansion pillars, and for the use of a backhoe at various points during the field season.

Out of the field, John Milner Associates were fortunate to have the participation of the Museum Applied Science Center for Archaeology at the University Musuem, University of Pennsylvania in carrying out the analytical program. At MASCA, Stuart Fleming, Scientific Director and Vincent Pigott, Research Specialist coordinated and facilitated the carrying out of the program. Nicholas Hartmann took the photographs of all sampled specimens and objects, as well as the microphotographs. Reed Knox, retired metallographer and MASCA volunteer, was of great help in the identification of the microstructures of the metal. Charles Swann at the Bartol Research Foundation, University of Delaware, carried out all the PIXE analyses. Gerry McDonnell of the Archaeometallurgy Group of the University of Aston in Birmingham, England kindly supplied the report on the metallographic examination of the slag. Prior to the examination of the samples, Harvey Yellin of Samuel Yellin Metalworks, provided the important *sine qua non* of cutting them.

In the interpretation of the results of the analytical program, as well of the archaeological data, Michael Notis, Lehigh University; David Gaskell, University of Pennsylvania; and Robert Gordon, Yale University all made most helpful comments on the slags, and in the case of Michael Notis, on the metal as well. Heidi Moyer, Lehigh University, carried out the supportive JEM work. A trip to the Spring City Foundry, Spring City, Pennsylvania, facilitated by Morton Kanter, vice president and Samuel Marcus, president, and guided by Donald Stroop, foreman, was extremely illuminating and allowed identification of enigmatic artifacts. Sheila Charles of the Museum of Afro-American History, Boston, Massachusetts kindly supplied samples of cupola slag from the Highland Foundry site.

A trip was made to the important ironworking site of Ironbridge (England), where dicussions with Stuart Smith, Deputy Director and Curator, Ironbridge Gorge Museum Trust, were extremely informative. He also facilitated a study of the copious collection of slag samples held by the Trust which was of crucial importance in the analytical program, and arranged for the work undertaken by Gerry McDonnell. Much appreciated assistance in artifact identification was given by Robert Vogel and Donald Berkebile, National Museum of American History, Smithsonian Institution.

Finally, other members of John Milner Associates' staff provided support throughout the project. Alex H. Townsend directed the project from 1979 through January of 1982 and produced draft manuscripts which formed the basis of Chapters I and II. Report graphics were prepared by Sara Ruch. Plates 10 through 15 were taken by Thomas Struthers, who also provided support in coordinating and reviewing this report. Pamela McAlonan typed the manuscript and attended to numerous other production details.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I. INTRODUCTION

The Maryland State Highway Administration, in cooperation with its dualization of U. S. Route 15, has undertaken a program of mitigative archeological investigations at Catoctin Site 18FR320 in Frederick County, Maryland. The first season of intensive excavations, conducted in the summer of 1979 by John Milner Associates, Inc., revealed archeological remains far more extensive, numerous, and complex than had been anticipated. It was recognized that full elucidation of the site's research potential would require additional excavations, and accordingly, the initial excavation report (John Milner Associates 1980) delineated remaining research questions and described the excavations and findings to date. The second season of excavations was undertaken by John Milner Associates in 1981 and added significantly to both the types and quantity of data available. The following report details the 1981 excavations and synthesizes its findings with those of the 1979 work in order to present a complete description, analysis, and interpretation of Catoctin Site 18FR320.

The following sections briefly describe the site and its location, and summarize previous investigations and specific objectives of the 1981 excavations. Chapter II provides the historical background of the site and is followed by a synopsis of applicable technological information. Chapters IV and V detail the 1981 excavations and present the analysis of recovered artifacts respectively, and form the basis of site interpretations offered in Chapter VI. The final chapter summarizes the investigations and presents their conclusions. References Cited, Figures, Plates, and Appendices complete the report.

A. Project Location and Description

Site 18FR320 is located in Frederick County, Maryland immediately north of the intersection of U. S. Route 15 and Maryland Route 806, approximately twelve miles north of the city of Frederick and three

miles south of the town of Thurmont. Relative to Catoctin Furnace, the site lies about three quarters of a mile south of the extant furnace stack and the adjacent Ironmaster's House. Occupying a rectangular parcel of land sandwiched between U. S. 15 and Maryland 806, the site is defined on its north side by the stone and earth embankment of the "Auburn Dam," and by a sizeable drainage ditch on the south (Figures 1 and 2). Highway and attendant drainage modifications have obviously infringed upon what was once a wider area of historic features.

Following construction of the present alignment of Route 15 in 1964, the site area became a vacant field covered with scattered trees and seasonally heavy brush vegetation. Prior to highway construction, the site area had been the east boundary of the Auburn estate grounds marked by two stone gate pillars, and was bisected by the earlier alignment of Maryland 806.

Geologically, Catoctin is situated along the boundary between the "Blue Ridge geologic province on the west and the Triassic Lowlands section of the Piedmont geologic province" (Fauth 1980:8) to the east. This location is much more than coincidental, since iron ore deposits in this region are formed primarily where quartzitic deposits of the Blue Ridge province are juxtaposed with the carbonate deposits of the lowlands (Fauth 1980:8).

While iron ore deposits may have been the key factor in determining the general location of Catoctin Furnace, it is also significant that additional natural resources necessary for the successful operation of an ironworks were readily available. These requirements include streams for the provision of water power, limestone for use as flux, and abundant timber for the provision of charcoal. It is interesting to note that iron ore and water power were present in the immediate vicinity of site 18FR320 and were not simply characteristic of the Catoctin area in general.

B. Previous Investigations of the Site

Because the present report is intended as final and complete archeological documentation of site 18FR320, and because previous investigations of the site played a major role in shaping the design of the 1981 excavation, it is important that the results of earlier archeological excavations of the site be presented here in summary fashion. Previous investigations include the site testing conducted by Kenneth Orr in 1977 and the first season of intensive excavations conducted by John Milner Associates in 1979.

It was the archeological testing of the site in 1977 by Kenneth Orr which led to a recommendation for its intensive excavation. Testing of the site, coupled with local informant interviews, seemed to suggest a functional division of the area into two sites--a forge site and an adjacent site conjectured to be the locus of iron casting or founding activities.

The evidence for the existence of the forge was an 1858 map of Frederick County on which an "Old Forge" was located, and oral tradition which located a "forge" in the vicinity at the end of the nineteenth century. The existence of the conjectured foundry was based solely on materials recovered in the course of test excavations, and the interpretations there of by both Orr and Edward Heite. These materials included gate metal from casting operations, fragments of cast iron artifacts, and slag of a type thought by Heite to be indicative of foundry activities (Orr and Orr 1977:11).

In joint consultation with Kenneth Orr and representatives of the Advisory Council for Historic Preservation, the Maryland Geological Survey, Interagency Archeological Services, the Maryland Historical Trust, and the Maryland State Highway Administration, a research design for intensive investigation of site 18FR320 was formulated. Initially, this research design called not only for the excavation of the conjectural foundry area, but for a limited examination of the forge as well. Emphasis was placed upon a determination of the relationship between forge and foundry.

Overall goals of the project as the 1979 investigations were begun were as follows:

1. Determination of the exact configuration and location of any remains of industrial structures, if present.
2. Determination of the function of any structural features encountered.
3. Determination of the means of construction of the stone dam and the basin which it encloses.
4. Determination of specifics of the use of waterpower and other technological aspects of iron production of the conjectural foundry and forge.

The excavation strategy employed in the attempt to satisfy these goals was one which involved the excavation of a series of long, narrow trenches coupled with the excavation of a number of five foot squares. While the trenches were designed to reveal feature and stratigraphic relationships from one part of the site to another, the small squares were designed to allow careful examination of individual features and strata and to facilitate a more controlled recovery of associated artifacts.

Although excavation of the forge area was soon abandoned and despite eight weeks of intensive hand and machine excavation, it was not possible to adequately satisfy the goals which had been established. This failure was largely a function of the unanticipated complexity and size of the site. Excavation of the forge area, moreover, was frustrated by the instability of the thick slag fill, measuring some eight feet in depth. To be sure, a number of historic structural features were located, and extensive artifactual evidence of iron manufacture was recovered. Nevertheless, a number of significant questions remained unanswered at the conclusion of the field project, and the report of these excavations (John Milner Associates 1980) outlined a series of recommendations for further investigation.

While it is not necessary in this chapter to discuss the findings of the 1979 field season in detail, the major discoveries included a rectangular building foundation with a yellowish sandy floor (Feature 1), a rather substantial stone wall (Feature 4), smaller stone walls (e.g., Feature 6), and numerous deposits of slag and charcoal containing cast iron artifacts and waste materials. Based upon the evidence of a possible raceway recovered by Orr immediately north of the site area near the southwest corner of the dam, it appeared that a watercourse may have entered the northwest portion of the site and that this area was thus critical for further excavation. In fact, the absence of a clear raceway feature in the 1979 excavations presented the project with a major puzzle, since it was assumed that waterpower would have been a requirement for the manufacture of iron. This same absence also served to dampen speculation that site 18FR320 may have been the location of the first iron furnace at Catoctin.

Due to the unanticipated extent and complexity of the site, it appears that the approach taken toward the investigation in 1979 was too fragmentary to allow adequate interpretation. That is, the excavation of small, scattered squares and long, narrow trenches did not provide sufficient opportunity for the determination of stratigraphic relationships across the site. The total number of hours allotted for investigation of the site, moreover, did not prove sufficient to allow for the excavation of an adequate sample of the site area.

The report of the 1979 excavations included the following needs and recommendations for further archeological investigation at site 18FR320:

1. Further examination of known and yet to be discovered structural features needs to be undertaken.

2. More information is required concerning the stratigraphic relationships between features.

3. Exploration needs to be undertaken to the north and south of the excavated area in order to more accurately determine site boundaries.

4. Further efforts are required in order to determine specific aspects of the use of waterpower at the site.

Each of these recommendations was taken into consideration in the formulation of a research design for the 1981 field investigations.

C. Research Objectives of 1981 Investigations

Prior to the initiation of on-site investigations, a revised research design was formulated in consultation with representatives of the Maryland State Highway Administration, the Maryland Geological Survey, and the Maryland Historical Trust. The objective of this reformulation was to ensure a maximization of the recovery of the kinds of data necessary for adequate mitigation of expected adverse effects to the site. The formal research design resulting from this consultation focused upon a number of objectives, some of which were very similar to those which served as project goals during the investigations conducted in 1979.

1. Determine with greater accuracy the horizontal extent of historic ironworking features and deposits.

Excavations in 1979 revealed that site 18FR320 extends over an area exceeding 10,000 square feet, far in excess of the previous estimate of 6,300 square feet. For this reason, it was deemed necessary to expend some effort in an attempt to more accurately define site boundaries. Accordingly, one of the goals of the 1981 field season was the subsurface exploration of the areas immediately north, east, and south of the 1969 excavation units in order to determine the existence of additional features and deposits associated with historic ironworking activities.

One aspect of the determination of site boundaries involved excavation both through and beneath the Auburn Dam. Because

excavations in 1979 had yielded evidence which suggested the dam post-dated the conjectured foundry operations at site 18-FR320, it was hypothesized that remains of historic features might exist beneath the walls or basin of the stone and earth enclosure. The mass of overburden presented by the walls of the dam effectively ruled out hand excavation for the satisfaction of this goal, requiring that excavation be conducted with the aid of a backhoe. Initial plans thus called for the excavation of two parallel trenches through the south wall of the dam and into the interior of the enclosure, stretching northward from the area excavated in 1979.

Results of the 1979 excavation also indicated that the site extended further to the east than had originally been thought. Feature 6, for example, a narrow stone footing, clearly extended eastward beyond the limits of the excavation. Once again, it was decided that the most effective investigation could be undertaken with the use of a backhoe, and it was decided that a series of parallel trenches be opened along the east side of the site.

Although subsurface testing conducted in 1979 by Kenneth Orr revealed no evidence of ironworking activity in the area south of a highway drainage ditch flowing west to east beneath U.S. 15 and Maryland 806, it was decided that any attempt to further define site boundaries required additional testing in this area. Again, backhoe trenching was deemed the most appropriate excavation strategy.

2. Determine additional details of ironworking technology as practiced at site 18FR320.

Another significant objective of the 1981 excavations was the recovery of additional information regarding the specifics of ironworking technology at site 18FR320. Of principal interest

was the recovery of evidence concerning the nature of waterpower at the site, this being seen as a key to the discovery of associated technological features and their interpretation.

The 1981 project was fortunate in having the active participation of the Museum Applied Science Center for Archaeology at the University Museum, University of Pennsylvania, in carrying out a program of metallurgical analysis of selected samples of slag, casting waste, and cast iron objects recovered from the site during the 1981 excavations. The research objectives in undertaking this analytical program included the following goals:

- To determine what metallurgical process was producing the slag found on-site.
- To identify the type of iron being produced, and what its mechanical and foundry properties would have been.
- To understand the metallurgical relationship between the slag and iron.

3. Determine the relative chronology of features and deposits.

Specific questions were raised in 1979 regarding the possibility of successive periods of industrial activities at site 18FR320. That is, was the site relatively static over time or is there an archeologically recognizable sequence of industrial activities?

Because of the fragmentary nature of the 1979 excavations, it proved especially difficult to make stratigraphic comparisons and interpretations regarding the relative chronology of excavated features. This was made even more difficult by the lack of necessary time and manpower to excavate certain areas of the site to depths sufficient for stratigraphic correlation.

Accordingly, it was determined that intensive excavation would be undertaken over a comparatively wide area of the site in an explicit effort to determine stratigraphic correlations and relative chronologies. A better understanding of the technological

evolution of the site was seen as important in determining whether variations observed amongst the cast iron waste and implements recovered from the site are reflective solely of the different types of contemporary items once manufactured and/or used at the site or whether these variations also have spatial and temporal correlations.

4. Determine the function of structural features exposed during excavation.

It is of crucial importance to an overall interpretation and assessment of the site that the function of each structural feature be determined as closely as possible. It is important to determine, for example, whether the features unearthed at site 18FR320 are remains of structures once associated with the primary manufacture of cast iron, or whether they are remains of ancillary structures used for final processing or storage. In the absence of such determinations, the relationship of the site to the Catoctin Furnace complex remains in doubt.

Interpretations of function also have an important bearing upon the determination of technological change at the site. Interpretation of this nature may suggest, for example, that the site underwent a change from primary manufacture to a more secondary function.

In comparison with the determination of site boundaries, the satisfaction of each of the other project goals was viewed as requiring an emphasis upon careful hand excavation. The use of heavy machinery in this respect was in fact restricted to the occasional removal of overburden.

D. Excavation Methods

As in 1979, the 1981 excavations were conducted within the framework of a horizontal grid which functioned as a spatial reference for the location of excavation units and excavated materials. This grid, the

same employed in 1979, is anchored to a datum marker set in concrete on the south edge of Maryland Route 806, situated so as to avoid impact from the dualization of U. S. 15. The grid is oriented on an approximate north-south axis and is infinitely expandable in all directions. Each grid unit is labeled by the position of its southwest corner in relation to an arbitrary point located 39 feet north and 136 feet west of datum and designated North Zero/East Zero, or simply NOEO. The reason for locating the NOEO point away from the site datum was to provide a point close enough to the excavations for practical grid measurements and at the same time to fit most of the excavation area within a single grid quadrant (north and east of NOEO). An excavation unit having as its southwest corner a point lying 50 feet north and 35 feet east of NOEO would thus be designated as unit N50E35.

In contrast with the 1979 excavations, all mechanically excavated trenches dug in 1981 were aligned with the site grid, with the single exception of a large trench through the south face of the Auburn Dam. In the latter instance, a decision was made to orient the unit perpendicular to the face of the dam in order to reveal a more representative cross section of this feature.

Based on the 1979 excavations, it was believed that most of the site's data were to be obtained through examination of its features, supplemented by artifactual data. Accordingly, recovery techniques were chosen with an emphasis towards the exposure of features with less emphasis on the recovery of every artifact. The bulk of the excavation was carried out with pick and shovel, trowels being utilized only when necessary. Similarly, excavated soils were passed through wire mesh screen only when necessary for the recovery of a sample of small artifactual materials.

II. SITE HISTORY

A. Historical Background: Catoctin Furnaces

The history of ironworking at Catoctin Furnace has been described in a number of reports, some of which discuss the development of the site in a fair amount of detail. This previous research has been heavily relied upon in this section, which attempts to integrate these previous studies into a summary which is relevant to site 18FR320 and to the iron technology of Catoctin Furnace.

The construction date of the first Catoctin Furnace is uncertain. A furnace was probably in existence by 1776 when James Johnson and Company acquired additional land to add to the tract already in their possession for which they were to pay one hundred tons of pig iron (National Heritage 1975:4). The initial land patent by Thomas Johnson and Benedict Calvert in 1770 was "for the purpose of Erecting and Building an Iron Works" (National Heritage 1975: 4), but how soon the furnace was in blast and producing after this date is uncertain. The furnace was certainly in production by July 22, 1776 when Thomas Johnson, in reply to an earlier letter from the Maryland Council of Safety, stated that "We have now by us a few potts of about the size you describe [two gallons and four gallons], a few kettles & a few Dutch ovens of much the same contents." (Contract Archaeology, Inc. 1971:17-18).

Further corroboration of the furnace's existence and activities is given in a 1777 newspaper advertisement which refers to "Salt pans ten feet square and 15 inches deep with screws ready to join and fit them up at Catoctin Furnace about 10 miles from Frederick Town." (John Milner Associates 1980:5). In 1780, the furnace was producing ten-inch shells for the Board of War (National Heritage 1975:5; Documents 1 through 5), and a dated stove of 1786 (National Heritage 1975:Plate 1) demonstrates that stoves were being produced after the Revolutionary War.

According to John Alexander, writing in 1840, who obtained his information from a descendant of the Johnsons, the furnace was built in 1774 and operated successfully until 1787," in which year the same company erected the present furnace, about three fourths of a mile further up Little Hunting Creek and nearer the ore banks" (Alexander 1840:78-79).

In 1811 Baker Johnson, who was then the owner of the furnace, died and the property was sold by his heirs to Willoughby and Thomas Mayberry of Philadelphia in 1812 (National Heritage 1975:7). An inventory taken at the time of Baker Johnson's death listed a blast furnace, wheel and bellows, a large dwelling house, two storehouses, a chopping mill, stonesmith shop, barns, stables, and cornhouses (Thompson 1976:65). In his will Johnson left his house, Auburn, which was built around 1804 (National Heritage 1975:7), to his son (also called Baker), and his daughters received the furnace and furnace lands (Contract Archaeology, Inc. 1971:21). A newspaper of this period states that there were two furnaces in Frederick County producing 380 tons of pig iron and 400 tons of pots and stoves valued at $42,970.00 (Contract Archaeology, Inc. 1971:21). One of the two furnaces was Catoctin; the other, a furnace also owned by the Johnsons, was erected on the Monocacy River in 1787 (Thompson 1976:64).

In 1820 Catoctin was bought by John Brien and John McPherson and added to their already substantial ironmaking investments (Thompson 1976:79-80). The sale inventory for the property included "A commodius casting-house and pot house, sufficiently large for sixteen moulders, built of stone, office and storehouse, coal house, two blacksmith's shops, a large ware-house and stables for four teams; chopping, stamping and saw mills all in complete order . . . Also 22 houses for Workmen." (Thompson 1976:81). During this period, in 1836, the furnace shipped castings to the railhead at Frederick where they were transported on the rail line to Baltimore (National Heritage 1976:10; Document 6). Other products were hollow ware (Contract Archaeology, Inc. 1971:22) and stoves (National Heritage 1975:Plate 2).

Brien and McPherson rebuilt the stack in 1831 and added 3,000 acres more to the 5,547 they already owned (Thompson 1976:84-85). An 1841 sale notice lists property at the furnace including ironworkers' houses and a grist and saw mill, but makes no mention of the actual furnace. After the death of John Brien, the furnace was operated by his heirs until it was sold in 1843 to Peregrine Fitzhugh (National Heritage 1975:10-12).

Under Fitzhugh the furnace which had been out of blast since 1839 was modernized: by 1850 ninety workmen were producing 5,000 tons of pig iron and castings and a steam engine was providing power for the operation (Thompson 1976:103). In 1848 and in 1855 records indicate that pig iron from Catoctin was being sold to foundries in Baltimore (National Heritage 1975:12). In 1856 Fitzhugh sold a half share in the furnace to J. Kunkel; at this time, the inventory of property belonging to the furnace included six teams of horses and mules, wagons, the ore mines and furnace stack, furnace tools, blacksmith tools, carpenter tools, farming tools, and ore bank mules (Contract Archaeology, Inc. 1971:41-42). Fitzhugh's financial problems which had caused him to sell a half share to Kunkel worsened, and by 1859 he had forfeited his remaining interest in the furnace and the whole of the property came into the possession of J. Kunkel (Thompson 1976:105).

In 1856 Fitzhugh had erected a steam operated cold blast charcoal furnace (Isabella) alongside the existing hot blast furnace (Contract Archaeology, Inc. 1971:24). In 1860, under Kunkel, the production of the furnace was 4,500 tons of pig iron and castings per year; an 80 horsepower steam engine was providing power for the furnace, 90 men worked at the furnace, two men at the foundry, three men at a blacksmith's shop, and two men at a wheelwright's shop; the main products of the ironworks were heavy castings; implements, tools, and wagon iron were also being made (Thompson 1976:105-106). In 1873, a new steam operated hot blast coke furnace (Deborah) was built with a capacity of 35 tons a day which produced pig iron and foundry iron (Contract Archaeology, Inc. 1971:25).

Under Kunkel and his sons the furnace attained its greatest period of productivity. In 1870 the furnace complex was capitalized at $150,000.00 and its iron production was valued at $142,000.00 (Thompson 1976:106-107). In 1880 the property included three stacks, 10,000 acres of land, warehouses, shops, storehouses, 50 ironworkers' houses, two steam engines, and 30 ore carts; the iron producing capacity of the complex was 10,000 to 12,000 tons and an estimated 500 men formed the work force (Contract Archaeology, Inc. 1971:26). After a short period of operation as the Catoctin Iron Company after Kunkel's death, the furnace went out of blast in 1892 (Thompson 1976:108). In 1899 the furnace was sold to the Blue Mountain Iron and Steel Company which enlarged Deborah in 1900 and ran the furnace until 1903 (Contract Archaeology, Inc. 1971:28). This was the last time that the furnace was in blast; in 1905, the property was sold to Joseph E. Thropp who mined the ore banks and dismantled some of the furnace structures for scrap (Thompson 1976:109). The 1787 stack had been pulled down in 1890 (Directory 1894:71), leaving only two operational furnaces.

The history of ironmaking at Catoctin appears to have run a similar course to many other eighteenth and nineteenth century furnaces. In the eighteenth and early nineteenth centuries, Catoctin produced the traditional range of "country castings," hollow ware, stoves, some munitions during the Revolutionary War, and a variety of other small castings. By the mid-nineteenth century, the furnace appears to have largely abandoned the production of this type of product in the face of increasing competition from urban foundries and was specializing in heavy castings. During this period, the furnace reached its highest level of prosperity and diversification, and appears to have been manufacturing wagons, tools and agricultural implements, as well as heavy castings. The furnace was becoming mechanized and had steam engines, a narrow gauge railroad running to the ore banks, and a steam powered foundry (Thompson 1976:105-106).

The documentation relevant to the furnace during its 130 year history is fragmentary and sparse. Most of the furnace journals are said to have been destroyed in 1927 when the furnace office was dismantled (National Heritage 1975:17). While the surviving documentation indicates something of the size and scale of the major components of the ironworking complex, especially in the second half of the nineteenth century, the paucity of the documentary evidence creates gaps which make interpretation of some aspects of the furnace operations difficult.

Specifically, the chronology, operation, and location of various ancillary structures throughout the period of the furnace complex are not well understood (cf. Struthers 1981:82). Site 18FR320 is probably an area of those ancillary structures, and as such does not appear directly in the records and notices cited above. However, a good deal of indirect and circumstantial evidence relating to the site can be garnered from the documentation, as discussed below.

B. Historical Background: Site 18FR320

The Auburn Mansion, built by Baker Johnson early in the nineteenth century, is located quite near the 18FR320 site. The old driveway to the house runs across the excavation area flanked by two stone gate posts erected in the 1920's (Orr and Orr 1977:10). The relationship between the Auburn Mansion tract and the furnace lands is indicated by a deed of 1802 which states that 934 acres were resurveyed and incorporated into the Auburn tract (Contract Archaeology, Inc. 1971:20). The wording of the deed indicates that this was land already owned by Baker Johnson which presumably was now being separated from the furnace lands. The 18FR320 site probably is located on what was then the Auburn tract and, presumably, was also separated from the furnace lands at this time.

How long the site might have remained out of furnace ownership is uncertain, but the furnace owners in 1831, Brien and McPherson,

acquired 3,000 additional acres of land, part of which included the Auburn tract (Thompson 1976:84-85). In 1843 when Peregrine Fitzhugh bought Catoctin Furnace, the property included Auburn Farm which suggests that the furnace lands included part of the Auburn tract at that date (National Heritage 1975:12). In 1848 what is described as the "warehouse" plot was bought by the Auburn owners. This purchase excluded the stream, pond, and forge site. The warehouse was apparently on the left of the driveway near the gate, and reference is also made to a gate near the "forge where castings were made" (Heite 1980:3). Assuming the pond referred to is the earthen dam which still stands at 18FR320 and given the mention of the "driveway," it seems probable that the property described by this source can be equated with the excavation site.

The reference to the "forge" is also interesting in the light of the evidence of the 1858 Bond Map which shows a forge located to the south of 18FR320 (Struthers 1981:Figure 4). Despite the extensive documentary research carried out on the history of Catoctin, no other references to this forge have been located. The 1808 Varlé Map, while it identifies the furnace to the north of 18FR320, does not show any evidence of a forge (National Heritage 1975:7). The inference of this map evidence is that the forge was built after 1808, but if as suggested above this portion of the Auburn tract was not owned by the furnace until after 1831, it would be unlikely that the forge was in existence before 1831. The identification of the structure as an "Old Forge" in 1858 suggests that by this date the building was defunct. The implications of this interpretation are that the forge building was very short-lived as a functioning industrial structure, an interpretation which perhaps accounts for the paucity of historical documentation concerning it.

On the 1858 map the forge is shown schematically on the east side of the highway with another structure on the opposite side of the road, and slightly further to the north which would place it within the area designated as 18FR320. Neither of these structures is shown on the 1873 Lake Map (Struthers 1981:Figure 5), suggesting that both were

overgrown or in ruins by then. The oral history evidence, too, indicates that the "forge" was a ruin probably by the 1870's; these sources also describe "boating on Auburn Lake" (Orr and Orr 1977:8), which presumably relates to the present earthen dam on the site.

According to the oral history interviews carried out in the 1930's, the water from the dam ran beneath a brick arch which carried the highway over it. This was said to be "within the memory of middle-aged residents" indicating, perhaps, a date in the 1890's (Orr and Orr 1977:78). Interviews carried out in the 1970's suggest that the dam powered the forge which was located below the ravine (Orr and (Orr 1977:8). The dam is thought to have been constructed c.1845 (Contract Archaeology, Inc. 1971:51-52), and the 1848 reference discussed above referring to a pond in this area, supports that dating. The highway which passed over the ravine (Route 806) was moved 20 feet to the west in the early twentieth century, and the ravine was filled in with furnace slag (Orr and Orr 1977:78). Little use appears to have been made of the site area in the twentieth century, which was overgrown and had a number of fairly substantial trees growing on it when excavations commenced in the 1970's.

III. TECHNOLOGICAL BACKGROUND

There is no question but that at site 18FR320 one is contemplating a site at or near which ironworking processes were in operation. The finds of casting waste and slag from 1979 and 1981, and the proximity of the site to the Catoctin Furnace complex make this a foregone conclusion. Accordingly, it is important to have a good understanding of the different metallurgical processes which were involved in working iron in the nineteenth century: what form and construction the physical plant would have to take and what the products would be, both waste and finished. This section is tied to site 18FR320 in that discussion focuses on those activities of which evidence has been seen in the archeological record, or which the historical record suggests may have been in operation.

A. Furnaces and Hearths

In the late eighteenth and nineteenth centuries, iron was generally produced in the indirect method by primary smelting of iron ores together with flux and fuel in blast furnaces to produce cast or pig iron, defined as iron containing between two to five percent carbon, together with other impurities, most notably silicon, sulfur, phosphorus, and manganese. Cast iron, because of its high percentage of carbon, has a low melting point and is therefore easy to melt and cast into complex shapes. However, it is a brittle material that can be applied only in circumstances where it will not be subjected to shock loads, and it cannot be worked (Gagnebin 1957:7). Since these were not the mechanical properties desired for most uses, most of the iron produced in the first half of the nineteenth century was converted or refined to wrought iron (85 percent in 1831) (Temin 1964:25). Wrought iron is commercially pure iron with less than 0.5 percent carbon. It has excellent resistance to shock and vibration, and is readily welded and machined. It is soft, ductile, and malleable.

In England by this time, most furnaces were coke-fired, following Abraham Darby's success with using coke at Colebrookdale in 1709

(Schubert 1958:99). In America in the early nineteenth century most furnaces were still fueled by charcoal with the first commercially successful furnace to smelt with coke being Lonaconing in western Maryland, and the first commercially successful furnace to use anthracite being Catasauqua in Pennsylvania, both around 1839 (Sanders and Gould 1976:63; Swank 1884:272). However, charcoal was the only fuel in use at Catoctin until 1873 (and the only fuel found in quantity at 18FR320), so only charcoal furnaces are relevant to this discussion.

Early charcoal furnaces were substantial, stone-built structures in the shape of truncated pyramids. The stone shell enclosed the hearth proper, which would have been lined with some refractory material, preferably firebrick for the inwalls and sandstone for the hearth (Overman 1854:156-159). The products would have been cast iron, either in the shape of pigs or, if casting was being done directly from the furnace, objects; and slag.

Blast furnaces produced large quantities of slag, although charcoal furnaces did not, apparently, produce as much as coke furnaces. Alexander notes that an "ordinary-sized [English] coke furnace furnishe[d] about thirty tons of cinder per day" (1840:131). Slag might have just been run out of the slag notch to collect on the sand floor, as suggested in Diderot's engraving of 1763 (1959:Plate 90), or might have been run into iron carts, as suggested by Alexander (1840:131) as being the English practice.

The pigs might take various forms (Barriault 1978:Plates 5 through 12), depending on the form of the mold in the pig bed into which they were run, and were frequently, but not always, marked with the name of the furnace at which they were cast. Probably, this would depend on whether they were being sold in that form or being immediately utilized at the same complex for remelting or refining. A Catoctin pig which was apparently unmarked was found in the excavation within the casting house area of the standing stack in 1975 (Orr and Orr 1975:14 and Plate II).

Casting was also done at this time from remelting furnaces. Overman (1872: 189) discusses the advantages and disadvantages between the two methods:

> There is really no advantage in casting directly from the blast-furnace, for the iron is never of such uniform quality as to secure good castings . . . . There are, however, instances where casting from the blast-furnace is not only excusable but necessary . . . . Iron, cold-short of phosphorus, is generally not used in forges, and it has too little carbon left to admit of remelting. There is hardly any other way left but to make castings of such iron . . . . The only and best purpose it is adapted to is for casting hollow ware and stoves; it will form fine and sharp castings, and cooking pots made of such cold-short iron cannot be surpassed in quality.

Generally speaking, from the introduction of the drop bottom cupola in the New England region around 1850, the cupola was the foundry furnace *par excellence*, although the first cupola used in America seems to have dated around 1815 (Simpson 1948:191). Early cupolas were built on stone or brick foundations and might be constructed of cast iron staves held together by wrought-iron bands. The cupolas were only from six to eight feet high (Kirk 1899:149). An example of this type is preserved in the Musuem of Iron at Ironbridge, England. Ultimately, the most common form was a furnace, the shell of which was boiler-plate, lined with firebrick and set above the floor level on either iron or brick supports (Simpson 1948:Figures 170 and 171). The firebrick lining, within the narrow cupola, was generally made of wedge-shaped or curved brick (Kirk 1899:22).

Produced by the cupola were slag and cast iron products. The quantity of slag produced varied quite a bit depending on whether or not the cupola was fluxed; Kirk cites a figure of between 25 to 100 pounds of slag produced per ton of iron (1899:142), substantially less than the figure quoted of half a ton of slag for each ton of iron produced in the blast furnace (White 1980:57).

The material fed into the cupola would be pig iron and scrap, which would often include the gate metal from the castings. The fuel used most commonly was coke. The slag was released by dropping the bottom of the furnace after all the iron had been run out, or sometimes by running it from the tap hole with the iron (Kirk 1899:66).

Another remelting furnace in use in the first half of the nineteenth century was a reverberatory or air furnace. Reverberatory furnaces were rectangular structures which would commonly have a firebrick interior and common brick or iron plate enclosure; the hearth interior might be five to eight feet long and equally as wide with a 40 feet or higher chimney (Overman 1872:197). In the English iron industry, the use of remelting furnaces began about 1702 (and cupola furnaces about 1701) (Schubert 1958:101 and Figure 57); in the United States, they were in use at least from 1787 and probably earlier (Sanders and Gould 1976:173). The reason for the term given to them was that the hearth in which the charged pig iron was melted did not come in contact with the fuel; rather, the fuel (usually coal) was burned in a separate firebox and the hot air drawn over the pool of metal by the action of the chimney melted the iron (Morton 1973:Figure 4). Overman notes that at the time he was writing (1872), reverberatory furnaces "are in a great measure replaced by cupola furnaces" (1872: 196). Castings and slag were produced, but it is not known in what form the slag occurred.

In the first part of the nineteenth century, wrought iron in the United States generally was produced in charcoal forges (refinery and chafery). Henry Cort's technique of puddling, patented by 1784 (Morton and Mutton 1967:722) was adopted in America between 1820 and 1850; by 1856, only ten percent of the wrought iron produced in the States was made in forges (Temin 1964:101). However, Overman (1854:280)points out that charcoal forges produced superior wrought iron and that they were less expensive than puddling establishments: "Iron works, situated at remote places in the country, frequently find a favorable market for a limited quantity of iron."

The form that these would take has been well described for English examples (Morton and Wingrove 1971), and excavated American examples indicate they would have had substantially the same appearance (Lenik 1974; Ditchburn 1966). Generally speaking, within the forge would be four to six hearths which would appear similar to blacksmith's hearths. The base and chimney would be stone or brick built; the crucible or hearth proper would probably be lined with cast iron plates (Den Ouden 1981:63). It is not clear if firebrick would have been required. Cast iron plates would have provided a skidway to drag the pasty bloom or loop to the hammer and anvil, which would have been set into a massive tree trunk similar to those found at Saugus (Robbins 1959:60) and Chingley Forge (Crossley 1975:Plate X).

Bar (wrought) iron would have been the product, the dimensions of which may be as pictured in Diderot's Encyclopedia of 1763 (1959: Plates 96 and 98). Slag would have been produced in both the finery and chafery hearths, and the amount would have been directly proportional to the silicon content of the wrought iron, perhaps five pounds of slag per one hundred pounds of pig iron. However, Morton and Wingrove note that as a larger volume of slag would have been needed to work the charge effectively, additions of hammerscale, ore, and so on might be added (1971:27). The slag would overflow onto the sand floor in saucer-shaped depressions (Morton and Wingrove 1971:25).

Direct production of wrought iron in bloomeries has not been discussed because no evidence whatsoever suggests this would ever have occurred at Catoctin. Puddling has also not been discussed because the only mention of it at Catoctin occurs in John B. Kunkel's patent application of 1876, which is also the only mention of a cupola at Catoctin. In this he writes that "when operating upon metallic iron to eliminate its phosphorus I apply the dolomite either in the cupola or puddling-furnace . . ." (National Heritage 1975: Document 8).

In conclusion, the various finds that might be expected at a site where any of these furnace or hearth types were in operation will be summarized. For a charcoal blast furnace, a substantial stone foundation would be anticipated, along with finds of ore, limestone or some other fluxing material, and charcoal. Firebricks from the lining should be encountered, and volumes of slag. The cast iron and waste found would depend on whether the furnace was producing only pig iron or also finished artifacts. If the latter, then flask parts and molding tools (discussed in the following section) might be discovered, along with casting waste.

For a cupola, the physical remains of the furnace itself would be less substantial than for a blast furnace. However, some sort of a foundation or base would be required which would have to be quite solid, preferably constructed of solid stonework and possibly incorporating an iron ring on which to place the cupola supports (Kirk 1899:18). Firebricks from the lining would be expected; fragments of cast staves or boiler plate from the casing might turn up. Finds of pigs, gate metal, flask parts, and molding tools would all be likely, as would small volumes of slag. Most importantly, one would expect large quantities of molding sand.

Very little seems to have been written specifically about reverberatory furnaces, but the general description suggests a large structure which should have left substantial remains. Again, finds of firebrick would be encountered.

Refinery forges could be small or large, depending on the quantity of iron being produced and the number of hearths in operation. The hearths would need solid foundations, probably of brick. Finds of cast iron plate would be expected, both for the skid or dragway, and for lining the crucible. Anvil bases, and evidence of hammers would be anticipated. "Hammerscale," which is the name given to the flecks of oxidized iron which are created on the surface of heated iron and then knocked off in hammering, would build up on

the floor around the anvil bases and, with the slag squeezed from within the loop of iron itself, would probably form hard, concreted surfaces, as seen at Saugus (Robbins 1959:61).

Finally, no mention has been made hitherto of the power source needed to operate the blast which all of these installations would have required. Fundamentally, until steam-driven blowing-cylinders came into common use in the United States, which was probably not before around 1815 (Schubert 1958:105), the blast would have been supplied by water-driven bellows. At Catoctin, the first mention of steam power is in the 1850 Census (Thompson 1976:103).

B. Casting and Finishing

The most identifiable and diagnostic artifacts found at 18FR320 were the various items of gate metal and other casting waste, stove parts, and fragments of hollow ware. Accordingly, this section focuses on the specific processes of casting stoves, hollow ware, and machine parts, and the subsequent removal of casting waste or "fettling" of these items, and in the case of stoves, the assembling of them.

The way in which iron artifacts were cast in the nineteenth century was dependent on the shape and level of complexity of the finished artifact. Simple flat artifacts such as stove plates could be cast in open molds. This, at least, was the practice in the eighteenth century, and as late as 1820 some furnaces were still casting in this way (Tyler 1973:158). Stove plates cast in open molds tended to be of irregular thickness and weight, and were generally heavier than those cast in closed molds. A survey of stove plates in the collection of the Bucks County Historical Society showed that European plates averaged between a quarter and three eighths of an inch in thickness, whereas American made stoves averaged half an inch thick (Mercer 1961:37).

The conclusions of this limited survey agree with the known differences which existed between European and American founding practices. By the close of the eighteenth century, coke fired furnaces were the norm in Europe, and the higher fluidity of iron achieved in these furnaces enabled the casting of finer, more delicate stove plates in closed molds. By the early nineteenth century, improvements in blast machinery enabled higher temperatures to be achieved by charcoal furnaces. The increased temperatures made the iron more fluid and enabled American manufacturers to produce finer stove plates cast in closed molds (Tyler 1973:161).

Economic factors played a major role in determining why and when American iron manufacturers introduced new techniques for producing cast iron.

The availability of vast tracts of forest for coaling allowed the production of charcoal iron to continue long after the majority of European furances had changed to coke. Likewise, the casting of stove plates directly from the blast furnace, as at Hopewell Furnace (Walker 1967:151) was economically viable, as it produced items of greater value than pig iron. At Hopewell, stove production was a major source of furnace revenue until the mid-nineteenth century; for the most part, however, the stove parts were not assembled but were shipped out as parts to dealers who bolted them together and finished them (Walker 1967:156-158).

Finishing and assembling stoves required a supply of wrought iron and a blacksmith to manufacture the nuts, bolts, brackets, and other hardware needed to produce the finished stove. The archeological evidence at Catoctin indicates that stoves were assembled there as numbers of stove bolts were found. Blacksmiths were, of course, an integral feature of ironworking sites, and were kept busy repairing and manufacturing hardware for the use of the miners, colliers, and other ancillary workers. As the Catoctin furnace was in production from the 1770's, there were undoubtedly blacksmiths working there from this date. The furnace was producing stoves in the eighteenth century as witnessed by an example dated 1786 (National Heritage 1975:Plate 1), and if as suggested the stoves were being assembled at Catoctin, the services of a blacksmith would be required to produce the wrought iron hardware needed to bolt the stoves together.

The 1786 stove referenced above was probably cast in an open mold directly from the furnace. The patterns were of wood with the pattern or design carved in relief or sometimes formed out of sheets of lead which were nailed or glued to the wood; mahogany was the preferred wood "because it warps least" (Mercer 1961:33-34). By the early nineteenth century, more complex designs were being manufactured including curved plates which led to the use of flask molding (Tyler 1973:158). Some of the more elaborate stoves produced at Catoctin would have been made in flask molds as would the hollowware (National Heritage 1975:Plates 3, 5, and 6).

Flask molding of iron as a technique for the production of hollowware and later for stove plates dates from 1707 when Abraham Darby patented "a new way of casting iron bellied pots . . ." (Tyler 1973:145). The introduction of this method allowed finer hollowware to be cast, and because the technique was more rapid than previous methods, the finished products were produced more quickly and could be sold at a cheaper rate. Small castings such as stove plates, hollowware, "cartwheel bushes," and small machine parts were usually produced in wood or iron flask molds (Overman 1872:31). A pattern which replicated the shape of the desired casting was encased in green sand which had been tempered with charcoal before being rammed around the pattern in the flask.

For flat castings such as stove plates, the molding process was comparatively simple. More complex objects such as hollowware and stove plates with curved surfaces required the use of composite or "parted patterns" (Clemens 1924:Section 69:14). For casting hollowware, the pattern was often made from an existing iron pot which was cut in half after its feet and handles had been removed (Tyler 1973:147). The technique involved the use of a composite flask mold in which the two halves of the pattern were inserted upside down, and green sand was rammed around the pattern and around the feet and handle patterns. A wooden plug called a gate or sprue was pushed into the sand to form an opening for the molten metal, then the flask was turned over and the inside of the pattern was rammed with sand.

The green sand used to form the mold was high in magnesium and alumina which helped to make it plastic and cohesive; coal or charcoal dust was added also to help bind the sand (Spretson 1878:163-166). After the pattern was removed from the mold, the surfaces were smoothed and dusted with charcoal or blacking (Tyler 1973:147-148). This was to prevent the molten iron from sticking to and being roughened by the sand. Despite these precautions, however, the castings were frequently in need of cleaning. At Hopewell, the job of cleaning castings was frequently done by women,

and the molders were responsible for paying them at the rate of 75¢ per ton (Walker 1967:323). This no doubt encouraged the molders to produce better quality castings, as poor mold preparation would increase the number of castings needing cleaning with a direct effect on the molders' income.

The artifactual evidence for the casting process which might be expected on a site would usually consist of waste products and broken or faulty castings. Evidence of the kinds of products being made would be indicated by the castings themselves. The kind of casting technology in use would be shown by the waste iron, or gate metal, and by fragments of hardware from molds. Post-casting activities such as removal of casting scars and the assembling of items like stoves would be demonstrated by the presence of tools such as cold chisels, files, hammers, and wrenches.

Open mold casting is usually suggested by the presence of runners, half-round sections of cast iron which formed in the channels in the sand which led to the casting. Runners may be found with a main stem and a number of branches indicating flat bed casting of multilple items. These were usually small articles such "as parts of locks, latches, hinges, knife-blades, knife covers, and other small articles [which] are generally put ten or twenty or more together . . ." (Overman 1872:67). The open molds would be enclosed by a wooden frame or sometimes beds were formed by mounding sand up over pigs of iron to form a pouring basin (Clemens 1924:Section 72:6-7). Pigs of iron were, of course, cast from the blast furnace onto the casting house floor. This form of casting, known as open sand molding, was primarily confined to the production of pig iron, although items for foundry use were sometimes cast this way as well (Overman 1872:50).

Finds of gate metal, wedge gates, and sprues are indications of flask casting. Sprues are cylindrical tapering cast iron objects of varying length; wedge gates, as the name suggests, are wedge-shaped and they, too, are of varying sizes. Their function was to convey the molten

iron into the closed mold; after the casting had cooled, the sprues or wedge gates were removed. This was done with a hammer and chisel and then the casting scars were "scoured" with "dull, coarse files, which have been used and rejected by machinists" (Overman 1872:220). The trimming of the wedges or sprues were usually done by the molder on the foundry floor; scouring and the removal of ragged edges was carried out in the "fettling shop" (Spretson 1878:368-369).

The shape and size of gates is governed by the surface area of the casting; the aim is to ensure that the molten metal reaches all parts of the mold more or less simultaneously (Spretson 1878:184). Personal preference for the shape of gates was also a factor. Tyler cites the example of a stove in the William Penn Memorial Musuem, Harrrisburg, Pennsylvania, which has two doors cast with a wedge gate and one with a sprue (Tyler 1973:153). In general, the precise shape and volume of gates seems to have been decided by the individual molder on the basis of his experience.

Other evidence of flask casting might be represented by fragments of the iron flasks or the associated hardware. Hollowware was generally cast in iron flasks (Overman 1872:71). These flasks were made in several pieces to aid the molding process and were held together with clamps or hooks and eyes. Stove plates and other larger castings might be cast in wooden flasks. These, too, would have iron hardware and nails which could survive in the archeological record. Wooden flasks were often held together with flask clamps during the casting process when the wieght of the molten metal might force the two halves of the flask apart. Flask clamps were made of wrought iron and cast iron, and were clamped onto the flasks with wedges (Clemens 1924:Section 72:30-32). Other items associated with this form of casting are gaggers which were iron braces inserted in the mold to strengthen the sand, and chaplets which were iron braces designed to support the sand core of a mold (Overman 1872:75). All these items have distinctive and peculiar forms indicative of flask casting.

As mentioned above, the presence of a blacksmith was a prerequisite for ironworking sites. The equipment used in mining and transporting

ore to the furnace and the various tools used in the production of iron from the ore were usually made and repaired by the blacksmith. The presence of two smiths at Catoctin is documented in 1820 (Thompson 1976:81). A later reference which may be relevant to Catoctin indicates that blacksmiths were there in 1834. This source, taken from an inventory of John Brien's property, suggests that "8 Torr [tons] Bar Iron" was among the property at Catoctin, and also flasks and powder valued at $1,000 (Mid-Atlantic 1981:Appendix 1; Historic Documentation Report, n.p.). If this inventory actually relates to Catoctin, the presence of bar iron would indicate the presence of either a smithy or a forge. The reference to flasks and powder, which presumably means casting flasks and sand, supports the contention that flask casting was carried out at Catoctin.

An 1856 document lists horses, mules, wagons, and blacksmith's carpenter's tools at the furnace (Contract Archaeology, Inc. 1971: 24). In the 1860 census, a smithy employed three men who used ten tons of iron and 11 tons of steel to make wagon iron, plows, and tools (Thompson 1976:105-106). The function of the Catoctin blacksmiths varied with the changes in the types of products produced at the furnace. They would always have been involved in basic maintenance of tools and equipment, but would also be required to produce the wrought iron hardware needed to assemble stoves and salt pans. They may also have made hinges and catches for flasks and nails for wooden flasks. Various kinds of small specialized tools would be needed for moldmaking and other processes at the furnace, and these, too, would probably be made by the blacksmith.

By the second half of the nineteenth century, a change of emphasis is apparent in the type of castings being produced at Catoctin. In 1860, "twenty ton" castings were the main product (Thompson 1976:106). Large castings such as these would be cast in large flasks or possibly in open sand molds, but the net result would be to reduce the work load of the blacksmith, as fewer pots and stoves would be cast. This situation may be responsible for the apparent specialization in wagon production in 1806, when the blacksmiths made wagon parts, two wheelwrights made parts of 28 wagons, and the sawmill produced 10,000 feet

of boards (Thompson 1976:106). The apparently changing role of the blacksmith was a symptom of the changes in ironmaking technology which were occurring in the second half of the nineteenth century. The introduction of coke furnaces and the urban foundry forced the country furnaces to change from their traditional products, as these could be marketed more competitively by the town foundries (Tyler 1976:223).

IV. DESCRIPTION OF THE EXCAVATIONS

As discussed in the Introduction, excavations at site 18FR320 have been carried out over a number of seasons since 1977 by different personnel with varying goals and research designs. Coordinating the results is bound to be fraught with difficulty. In particular, correlating the stratigraphic soil layers encountered in the three seasons of excavation has proved most difficult. This problem is accentuated by the notable lack of closely datable artifacts within these layers.

In general, this chapter concentrates on the excavations of 1981. However, wherever possible the stratigraphic relationships observed in the 1979 excavations (John Milner Associates, Inc. 1980) and in some cases those noted in the 1977 survey (Orr and Orr 1977), have been correlated with the 1981 results. The 1979 work was relied on particularly for the sequence of layers in the approximately top two feet of fill over the entire site, which had been almost entirely removed by the 1981 season. Reference will be made to some of the profile drawings in the 1980 report on the 1979 excavations, and a shorthand system of notation, namely, "1980" preceding the figure number, has been employed to indicate that. For convenient reference, those figures are included in Appendix I following the figures generated for this report. Grid square notations will always refer to the ten-foot grid of 1981, unless otherwise indicated.

Because the stratigraphy and nature of the layers encountered varied markedly between the south and north halves of the site, they will be described separately, as will the upper levels of the site. The break line is considered to be at the N60 line. In the north, the stratigraphy is so complex that rather than trying to make uniform the field descriptions of the layers on the drawings, single letter designations have been given to the major layers discussed on all the figures, both 1980 and 1982, and in the text, to facilitate their correlation. The following paragraphs should be read with reference to Figure 3, an overall feature plan of the site.

A. 18FR320 South

The stratigraphically lowest feature encountered within the area of excavation in the south half of 18FR320 was F44, which consisted of a water channel dropping from west to east (Plate 1). It was traced through the entire excavation, from grid lines W5 to E55, and was excavated to the bottom, except in the easternmost ten-foot square. In the fifty feet of its excavated length, the bottom dropped one foot, nine inches. It had a broad, shallow, flat-bottomed profile with gently sloping sides (Figure 4). It had a width at the top of about eight feet, at the bottom of about four feet, and was about one foot, six inches deep, although these measurements varied substantially along its course. Its sides were defined by a layer of quartz pebbles in a finely divided yellow clay matrix.

F44 was defined along its entire southern edge, with the possible exception of the easternmost 15 feet, by a stone embankment which consisted of a substantial construction of rounded boulders in a sandy, yellowish-brown clay matrix (Plate 1). The boulders were in no discernible order, but rather heaped along the edge of the channel. They rose about a foot above the south edge of the channel and their overall height dropped by just under a foot from west to east.

Along the southern edge of the channel at a point approximately halfway up the slope were widely spaced stone features. These occurred in N30W5, N40F15, and N40E25 (Figure 5). The two latter features were about ten feet apart, but the first was 25 feet from the second. Their form varied: the west and east features consisted of three stones in a pile; the middle feature had a single stone beside a slot (four by ten inches) cut in the wall of the channel. They occurred at a uniform depth, approximately halfway up the south slope of F44. Four feet to the south of the middle feature, directly at the edge of the stone embankment, was a piece of cut wood standing vertically, the top of which was one foot, four inches above the level of the stone features.

The fill of this channel varied, and probably represented a gradual silting process. Above both sides and in the interstices of the rock

pile was a hard, mottled, tan and reddish-brown silty clay with lenses of red gravel, which seems to have had the effect of constricting the channel's width. In the center three feet were superimposed layers (from the bottom up) of fine mixed gravel which was extremely hard, yellow and red finely divided plastic clays, and fine red gravel (Figure 4). Within both the mottled clay and the layers in the middle of the channel, large quantities of wood were embedded. The pieces of wood were at differing levels and orientations, and varied quite widely in dimensions and type, from planks up to six feet long to five inch square posts to flat thin sheets to bevel-edged laths (Figure 5). Many of the pieces were pierced by nails, spikes, or wooden pegs. In the northeast corner of N40E15 and in the southwest corner of N50E25 were half sections of a massive tree trunk, three feet long.

Associated with F44 and the stone embankment was F40 in N20W5. This was another wide, shallow, flat-bottomed water channel with its course perpendicular to F44. It measured approximately five feet wide at the top. The bottom width of two feet at the N29 line narrowed to just under one foot at the N20 line. In that nine feet, the bottom dropped one and one-half inches. The sides of this course were formed of a hard, pinkish, mottled clay. Into this clay had been cut, along the east side of the channel, a flat-bottomed, straight-sided slot (F39) at least five feet, six inches long, eight inches wide, and 11 inches deep, with its bottom at a uniform depth. Its north edge was at N25.5, it extended south to N20, and must have continued outside the square. F40 was filled with a brown sand, then a gray clay, and was capped by a charcoal spread which covered the pink mottled clay to the east. At the base of this charcoal spread was a substantial amount of ferrous slag. Over the charcoal and filling of F39 was a dark yellowish-brown silty clay.

To the north of F40 was a one foot, six inch wide "break" in the stone embankment of F44. This was a diminuation in the height of the rock buttressing of no more than six inches. The base of the "break" was formed of the same rocks in sandy, yellowish-brown clay matrix as the rest of the embankment, but atop it were water-deposited fill layers equivalent to the fill of F44 to the north. The bottom of the "break"

was six inches above the bottom of F40 at the N29 line, and one foot, three inches above the bottom of F44. The stone feature mentioned above in N30W5 was directly to the north of the "break."

The layer which seemed to be stratigraphically contiguous with F44 was a dark reddish-brown silty clay with flecks of charcoal, which was the lowest artifact-bearing layer over the entire site, and was found uniformly to the north of F44. Because the deposiţon of this layer respected the water course, it is suggested that it was contemporaneous with the period when it was silting up. The artifacts and slag contained within it closely tie it to the layer which overlay F44.

The major feature which stratigraphically overlay both the water channel (F44) and the dark reddish-brown silty clay on its north bank was a roughly rectangular construction of stone about 50 feet long and about ten feet wide running at an approximately northwest-southeast orientation from the N40E5/N50E5 grid squares to the N40E45 square (Plate 1). The form its construction took was a closely spaced platform of large unworked boulders with the interstices filled with small stones and, in some places, brickbats. At the west end of the site in N40E5 and N50W5, it directly overlay both the uppermost layers of the fill of F44 and the dark reddish-brown silty clay with flecks of charcoal. Here it had a total height above these levels of no more than about six inches, and was the height of one boulder. At its eastern end, it overlay the same layers and more or less butted up to and intermingled with the stone embankment of F44, which is why it was difficult to define the latter in this area. The height of the rock platform here is as much as two feet below its height at the west.

Directly overlying the rock platform from the E5 line to the east was an extremely hard-packed ferrous slag which showed a metallic blue break. This was heavily compacted on top of and down into the interstices of the rocks. It uniformly overlay the rock platform, the stone embankment (in N40E35), and (to the north and west) the dark reddish-brown silty clay with flecks of charcoal. At the base of this level

in N40E25 within an elongated gap in the rock platform was a hard, gray clay with many pieces of wood (Plate 2).

To the north of the rock platform and its hard-packed slag surface in N50E45, was another stone construction (see within F45 in Figure 3). It took the form of an uneven rectangle, measuring four feet north/south by three feet east/west. It had an extremely informal construction, consisting of a loosely spaced platform of rounded stones and some fire-brick and brick fragments. Stones haphazardly placed extended from all but the southwestern corner. All the stones were sitting directly on and, in some cases, were sunk into the fill of F44. It was clearly not overlaid by the hard-packed ferrous slag layer, but it was not clear if it may have overlaid the edges of that layer. It was not as closely packed as either the rock platform or the stone embankment, and could not be described as a foundation (Plate 1).

Two layers are associated with these two features (namely, the rock platform and the stone construction described above). A layer of loamy, gray clay with wood chips and patches of charcoal, red gravel, and slag overlay the rock platform and its hard-packed slag surface. and extended over the fill of F44 to the north (in N50E35, in particular). It resembled the uppermost of those fill layers but had more inclusions, and contained increasing charcoal to the north.

Superimposed on the gray clay and wood chip level was a layer of a compact but not hard-packed reddish-brown mixed ferrous slag and charcoal layer. This also covered the stone construction in N50E45. To the north of the rock platform and stone construction, it covered the dark reddish-brown silty clay with flecks of charcoal. Directly over the rock platform this layer was quite thin, especially in the west. It got markedly thicker to the north, and also contained an increasing admixture of charcoal: at the north edge of N50E45 it consisted of a seven inch thick lens of charcoal. This mixed slag and charcoal layer extended south to the N40 line in the two easternmost grid squares. In the northeast corner of N40E35, a long plank of wood was lying on the mixed slag and charcoal layer, oriented northwest/southeast. It measured 12 feet long by one foot wide.

The next (stratigraphically defined) significant feature was F45, which was encountered in all four easternmost squares. It consisted of a layer varying between one and six inches thick (about four inches thick generally) of a soft yellow sand with clay and flecks of mortar with an uneven surface, rising about three to four inches to the northeast corner of N50E45. It was roughly rectangular, oriented northeast/southwest, and extended beyond the north and east banks of the area of excavation, so it was at least 20 feet long. Its width at its southwest end was about 10 feet. The southwest end seemed to be somewhat defined by the wooden plank mentioned above, although a spread of yellow sand with clay overlay it extending some two feet to the southwest beyond it. Directly to the northeast of the plank and parallel with it was a "hummock" of the same layer. Scattered on its surface in no discernible order were several large boulders and smaller stones (Plate 3). Contiguous to this feature to the northwest (in N50E35) was a layer of gray plastic clay. This gray clay overlay about two feet, six inches of the wooden plank extending beyond the mortar surface.

Both the gray clay and F45 overlay the mixed slag and charcoal layer, and both were uniformly overlaid by a red shale with slag inclusions, about four inches thick. Over the area of the stone embankment in the southwest corner of N40E35, the red shale layer directly overlay the mixed slag and charcoal layer. In the southeast corner of N40E35 and in most of N40E45 the red shale layer did not exist as described here. Above the red shale layer was a layer of brownish gravel with some discontinuous lenses of loamy charcoal between the two in the northwest corner of N50E35.

The stratigraphy above the hard-packed slag surface over the rock platform has been quite meticulously described for the easternmost four grid squares because it is here that it is most complex, and best related to the features. Almost all of the most crucial soil layers which elucidate the relationship and phasing of the structural remains of the southern part of 18FR320 appeared here, and their relationships can be extended out from these 400 square feet.

Moving west from the four eastern squares the stratigraphy was markedly simpler. As already discussed, the stone embankment, the watercourse fill, and the dark reddish-brown silty clay with flecks of charcoal were all encountered in the squares bounded by the grid lines N40-N60, W5-E35, at a stratigraphically equivalent level, though the dark reddish-brown silty clay was about five inches below the top of the rock buttressing, and the fill of F44 dipped slightly between them. As already mentioned, the rock platform and its hard-packed slag surfacing overlay both F44 and the dark reddish brown silty clay.

A layer of water-washed red gravel seen in the west wall of N40E15 (Figure 6) overlay the fill of F44 throughout N40E15 where it butted up to the edge of the hard-packed slag surface over the rock platform. This edge also seemed to be defined by an "edging" of pieces of timber lying in the surface of the F44 fill below the red gravel (Figure 7 and Plate 4). The red gravel layer continued into N40E25, still to the southwest of the edge of the slag and rock platform and stratigraphically at the same position, though much thinner (it does not appear in the E25 profile in Figure 4). It did not extend very far into N40W5.

The equivalent of the gray clay and wood chip layer which separated the mixed slag and charcoal layer from the hard-packed slag surface in N40E35 and N50E35 was also encountered in this area in N50E15.

The mixed slag and clay layer covered all of these levels, and extended right to the W5 line in these trenches. Again, at a distance from the rock platform, the mixed slag and clay layer showed increasing admixture of charcoal.

How do these layers relate to the two features found in this area in 1979? F1 was a rectangular stone foundation, with mortared walls of large boulders, about 21 to 24 inches thick. Its southern half measured about 21 by 11 feet (discussion of the northern half is postponed for the moment). The designation F6 was given to both branches of a smaller rubble foundation wall, about one foot, six inches thick. It had a

characteristic construction of small, thin "edging" stones placed vertically either side of larger stones placed flat and was unmortared. The corners of the south half of F1 were at grid points N47E13, N60E3, N68E30, and N55E34. F6 east/west branch was traced from the south edge of N30E15 (and must have extended further south) to the west edge of N40W5 (and must have extended further west); F6 north/south branch joined the east/west branch in grid square N30W5 and ran almost due north. It intersected with the F1 west wall and was traced into the interior of F1 where it seemed to end at grid point N57E13 (Plate 5). Despite careful examination, it was not possible to conclude if F6 cut through F1, or vice versa. However, the stratigraphic sequence uncovered in 1981 elucidated their relationship.

The southeast corner of F1 was encountered in the northeast corner of N50E25. Excavation in that grid square and the one to the east indicated that the foundation stones of the east wall of F1 were sitting on (or perhaps in) the red shale layer. Moving further west, it was clear that the south and west walls of F1 were on or in the mixed slag and charcoal layer. Although no wall trench for F1 was ever identified, in some cases (particularly for the west wall) the F1 stones were actually sitting on the hard-packed slag surface over the rock platform, and might therefore have cut through the layer above, or the surface rose sufficiently to be directly under the stones.

In contrast, the wall trench of F6 was cut into the hard-packed slag surface of the rock platform (in grid squares N40W5 and N50W5), and may have cut into the water-washed red gravel in N40E5. Most significantly, however, the mixed slag and charcoal layer cut into by F1 dipped into the destruction trench of F6 (east/west branch) (Figure 6). See also 1980 Figure 10, where the "dark reddish brown clay with gravel and iron waste" is equated with the mixed slag and charcoal layer. In other words, F6 predated the deposition of the mixed slag and charcoal layer, while F1 post-dated it.

Within F1 (south half) and more or less bounded by the foundation stones was a spread of yellow sand with clay and flecks of mortar

about two to three inches thick, identified as the floor of the structure in 1979. Outside F1 to the south and east, a layer of loamy charcoal showed some compaction and an artifact deposition pattern suggestive of its being an occupation surface equivalent to the yellow sand with clay surface inside. It overlay the mixed slag and charcoal layer to the south, but because that layer dropped to the east, at the east corner of the structure, this occupation surface was on top of the red shale layer. There did not seem to be an equivalent surface on the west.

The yellow sand with clay did intrude into the interstices of the foundation (see 1980 Figure 14). It also overlay the stones themselves in N50E25. A second line of small stones parallel with the south wall of F1 and extending along its course as far as the E25 line delineated the edge of this spread of mortar.

In N50E35 and N50E25 a trench (F41) had been cut down from the red shale layer, through it and the mixed slag and charcoal layer to bottom on the hard-packed slag surface over the rock platform. It extended from the middle of the north bank through both squares, parallel with the south wall of F1 and about nine inches south of it, was about one foot, nine inches wide at the N60 line and narrowed to one foot wide at the E25 line. It was about five inches deep and filled with a dark loamy matrix with large slag nodules and a little charcoal. Right along its base was a skim of a clean plastic beige clay. It had been overlaid by the small stones to the south of the F1 wall and by the yellow sand with clay and, accordingly, must have predated that occupation surface. Its course so closely corresponds to that of the wall of F1, however, that it is hard to believe that the two do not have some connection.

No evidence of such a trough had been recorded in the excavation of N40E15. However, in N40E5 a feature designated F34 had previously been defined under the mixed slag and charcoal layer. It was a very shallow (less than an inch thick) skim of clean plastic beige clay

about five inches wide in a trough cut into the hard-packed slag surface which extended in a northeast/southwest direction parallel to the south wall of F1 and about six inches to the south of it. It extended from the E15 line six feet, six inches to the southwest and then petered out. It is postulated that F34 represents the westernmost terminus of F41. It was not so recognized in the field, probably because without the red shale layer in this area, the walls of the trench cut into the mixed slag layer, and filled with a very similar matrix were imperceptible. Only the slick of plastic clay at the base was identifiable and, in fact, had also been noted in the field notes for N40E15, but not mapped. This hypothesis is supported by the profile across this area (Figure 6) where the dip in the mixed slag and charcoal layer between the water-washed red gravel and the rock platform may represent F34/F41.

Interestingly enough, the north/south branch of F6 seemed to interrupt F34. It is somewhat difficult to understand this given the clear-cut stratigraphic relationship between F41 and the mixed slag layer, and that layer and F6. Possibly F6 was an intrusion into the floor of F41/F34, although it was not noted as such in the field.

Overlying the charcoal and loam occupation surface and the mixed charcoal and slag layer, from about the N40E25 square to the east, was a layer of brownish gravel (Figure 4), which was the same as that over the occupation surface and the red shale layer in the eastern squares. There was no opportunity to observe the layers over the foundation walls of F1 (south) in 1981. However, this sequence was closely observed in 1979, and it seemed that a layer of "dark reddish brown crumbly clay with gravel" overlay much of the area contained within the south half of F1, and the stones themselves in some cases (1980 Figure 6). It is possible that this is equivalent to the (1981) brownish gravel.

Then overlying this area and, indeed, the entire site were two sequential layers. The lower one was a mottled dark grayish brown clay with flecks of rust and charcoal. It directly overlay the mixed slag

and charcoal layer in most of the area over and north of F44 (Figure 6). East of the E25 line it overlay the brownish gravel atop the red shale, and the red shale itself where the former did not exist. Above this layer of clay with flecks of rust was a layer of very dark grayish-brown loamy clay. In 1981 this was the starting surface of the southern part of the site, and was universally encountered.

It is postulated that the 1980 "dark yellowish brown clay mottled with charcoal" equates to the clay with flecks of rust, and the 1980 "dark yellowish brown sandy clay" to the brown loamy clay. If so, the former directly overlay the walls of F1 in some areas (1980 Figure 8). It will be noted, however, that in 1980 Figure 6, the two layers were not differentiated to the south of the milky quartz gravel (to be discussed below). The two layers were very similar, and at the southern, western, and northern periphery of the site where the flecks of rust and charcoal in the lower clay were lacking, it was difficult to distinguish them.

The area to the south of the stone embankment has not been discussed hitherto because its stratigraphy is markedly different from that to the north, and is not well understood. The sequence associated with F39 and F40 in square N20W5 has already been described, and it only remains to add that over the silty clay atop the charcoal spread, and the channel walls of pink mottled clay was the very dark grayish-brown loamy clay. The layer of clay with flecks of rust and charcoal was either not present or not distinguishable. The mixed slag and charcoal layer was also seemingly not present.

Further to the east, the sequence south of the stone embankment was best observed in N30E25. Here, below the very dark grayish-brown loamy clay, the clay with flecks of rust and the mixed slag and charcoal layer was a layer of compact ferrous slag and charcoal, as in the south half of Figure 6, where it also can be seen that F6 had cut through this slag layer (as well as through the hard-packed slag over the rock platform). This was not as hard-packed as that, but

consisted of flat circular plates and cylindrical chunks of ferrous slag, up to 18 inches wide or long. It sat on a pink mottled clay, which was also found in the two squares to the west at the base of the layers and is probably equivalent to that forming the bottom and sides of F40 in the farthest west square.

B. 18FR320 North

The stratigraphically lowest artifact-bearing layer in the north half of 18FR320 was the dark reddish-brown silty clay with flecks of charcoal already discussed above (Layer A). This covered the entire northern area excavation, and generally was the limit of excavation in 1981. It rose dramatically from south to north: on the northern bank of F44 in N50E5 the surface was two feet, six inches below datum; at the N60 line it was one foot, nine inches below datum, then rose sharply in that one square (N60W5) to ten inches below datum. It then rose more gradually to three inches above datum at the N100 line. It is likely that this layer is equivalent to the layer of reddish-brown subsoil with charcoal, brick flecks and slag which was under a layer of charcoal in a similar matrix which directly overlay the Auburn Dam (Figure 9). The top of this layer was two feet, nine inches above datum, so if it is the same layer across the site, it rose over five feet in about 85 feet.

Above this layer is one which, while varying markedly in degree and nature of inclusions, seemed to be encountered in some form or other throughout most of this area as well. This was a layer of charcoal which sometimes had quite an admixture of ferrous slag, and sometimes did not. Towards the southern limit of this area (i.e., the N60 line) it generally directly overlay or was stratigraphically equivalent to the mixed slag and charcoal layer (Figure 8). Around the perimeter of F1 (north half) it seemed to have taken on some of the attributes of an occupation surface, just as the mixed slag and charcoal layer did to the south of F1. Both those layers overlay the reddish-brown silty clay (A) and both contained large quantities of charcoal and varying amounts of slag, thus there is a tendency to think of them as the same layer. But in the north part of the site, charcoal seemed to dominate, while in the south part of the site ferrous slag nodules seemed to dominate; accordingly, this stratum will be termed a charcoal and slag layer (Layer B) in this part of the site.

A stratigraphically anomalous area was encountered in 1981 in grid squares N90W10 and N100W10 in the area bounded by T-3 on the east.

Beneath the charcoal and slag layer (B), instead of the reddish-brown silty clay expected, was a dark yellowish-brown gravel with pebbles side by side with a dark brown gravelly clay with charcoal veining. Below this was the reddish-brown silty clay (A), but here it included a seven inch thick layer of ferrous slag chunks in a spread extending northeast/southwest and covering most of grid square N90W10. Below that was the red shale which was the natural subsoil of the site, as established in a deep test trench here and in N70E10, and in the trench under the Auburn Dam (Figure 9).

Above the charcoal and slag layer in the northern part of the site, the stratigraphy across the center of the site was extremely complex and difficult to interpret. However, as far as it can be understood, the sequence seems to be as follows. Discontinuously interlensed with the charcoal and slag layer at the north of the site were layers of brown sand which seemed to be water-washed (Layer C) (Figure 10). This brown sand may be equivalent to that directly overlying the charcoal and slag layer in Figure 11 as well. Over that were two layers, a reddish-brown gravel (Layer D) underlying the dark grayish-brown clay with flecks of rust (Layer F).

The latter was the layer which in the south directly overlay the mixed slag and charcoal layer over most of the area. While it did not contain the flecks of rust to the north of the N60 line, it is believed to be the same layer, and the same designation is retained for the sake of clarity. The reddish-brown gravel is somewhat anomalous. It is possible that it is equivalent to the brownish gravel over the occupation surface and the red shale layer in the southeast. It is also possible that it may be similar to the brown sand (C) discussed above, as in Figure 8. It appeared that both these layers thinned towards the north, with the clay with flecks of rust (F) disappearing around the N95 line and the reddish-brown gravel (D) disappearing around the 105 line. The reddish-brown gravel must also have thinned out to the east, as it was not noted in N80E35 (Figure 12).

This stratigraphic sequence is made that much more confused by the presence of a stratum of brown sand (Layer E). In 1979, such a layer was

encountered from about the N80 line north in T-3 (1980 Figure 6). In that profile, it appeared to have been an intrusion into the red clay and charcoal (A) and generally to underlay the clay with flecks of rust (F). A layer exactly corresponding to this was not excavated in 1981, and it is not at all impossible that it is identical to the reddish-brown gravel (D). However, in 1980 Figure 16 both that layer and the brown sand (E) seem to be represented in the profile, and here the brown sand seems to be an intrusive or contiguous layer, extending west of about the E15 line. It appeared in N60W10 (1980 Figure 13), and probably is represented by the brown sand with charcoal in N80E0 (1980 Figure 9), but these correlations must be considered problematic.

The task of sorting out the layers in this area was made easier by the presence of a lens about one to two inches thick of milky quartz gravel. This was discovered in 1979 and designated F5, and virtually all examinations of its disposition took place during that season. It was discovered in about an eight-foot wide swath from at least the N90 line (where it was picked up in T-3), south between the Auburn mansion pillars to T-5, which cut through it in about the southeast corner of grid square N50E35 (see 1980 Figures 6, 8, and 18). It was made more or less oriented as T-3 was, which is why it is seen in almost the entire profile.

The presence of such a readily identifiable stratum is invaluable as a certain demarcation of a constant stratigraphic level. In 1981 it had been removed everywhere except in N70E10 and N80E10. There were layers, however, found directly under it in those squares and on either side of T-3 in the five northern squares through which it cut which performed the same service in 1981. These consisted of a hard-packed yellowish clay over varying and discontinuous lenses of brown sand, orange gravel, and a very bright yellow clay with shalestone chips (G layers). These layers overlay either the clay with flecks of rust (F) (Figure 11) or the reddish-brown gravel (D) (Figure 10), and are probably to be seen in 1980 Figure 9, though the stratigraphy is a little different. It was also given the feature designation F47.

Above the milky quartz gravel (F5) and its base layers (G), and above the clay with flecks of rust (F) and the reddish-brown gravel (D), was the same very dark grayish-brown loamy clay which had been the starting depth in the squares in the south part of the site (Layer H). This was found in all the squares.

This sequence of layers from the reddish-brown silty clay (A) to the brown loamy clay (H) has been described first to facilitate the stratigraphic locating of the features now to be discussed.

The stratigraphically earliest feature in the area was F43. This consisted of a small (15 inch wide) rubble wall, the construction of which was very similar to that of F6. The stones as excavated had cut into the dark reddish-brown silty clay with flecks of charcoal (A). Apparently, the charcoal and slag layer (B) had covered the wall (Figure 12), although this is somewhat uncertain as a trough which may have been the destruction trench for the wall was defined at that level. However, if the charcoal and slag layer did cover F43, it would be stratigraphically equivalent to F6 in the south part of the site, the destruction trench of which was filled with the mixed slag and charcoal. In any case, it and its possible robber trench were clearly overlaid by the clay with flecks of rust (F).

An important feature here was the northern half of F1. At the northwest corner of F1 (the south half) another wall was detected extending northwest from the corner. Its construction seemed somewhat more irregular than the walls of F1, consisting of somewhat smaller stones than the south half, mortared together. It measured about one foot, six inches wide. It cornered in N70E0 and this northern wall extended about 11 feet to the northeast. At this point, later intrusions seem to have removed traces of the wall (Plate 6). If the stone seen in the west profile of T-9 (1980 Figure 9) at grid point N79E22 was part of it, then F1 (north half) must have encompassed an area equivalent to that in the south half (stratigraphically, however, that stone is not equivalent to F1, as discussed below). No wall, however, ran north from the northeast corner of the south half of F1 to make the north half's fourth side.

It appeared, after careful observation of the juncture of the two walls in grid square N50E5, that there was a butt joint between the west wall of F1 (south half) and the wall between the two halves. This might suggest that F1 (north) was the initial construction, and that F1 (south) was an addition, perhaps chronologically later. Opposed to this hypothesis is the fact that F1 (north) with its open side has more of the appearance of an addition.

Stratigraphically, unfortunately, the sequencing was not clear. The foundation stones in the northernmost wall were sitting on the charcoal and slag layer (B), while those in the wall between the two halves were sitting on a layer which probably equates to the mixed slag and charcoal layer (1980 Figure 14). It will be remembered that the southernmost wall was on this layer. There did not appear to be an occupation surface inside the walls of the north half, such as the yellow sand with clay within F1 (south), although there was some suggestion of a loamy surface with patches of reddish shale and charcoal directly overlying the charcoal and slag layer (B) both inside and outside the walls. Stratigraphically then, all that can be said is that the construction of both F1 (south) and F1 (north) post-dated the mixed slag and charcoal/charcoal and slag layer, but the chronological relationship of their construction was not further clarified.

As far as the period of their destruction, this is unfortunately also not clear. The walls of F1 (south), as will be remembered, were covered either directly by the clay with flecks of rust (F) or in some cases by a spread of dark reddish-brown crumbly clay with gravel under the clay with flecks of rust. The north wall of F1 (north) was covered by a layer variously described as ashy dark gravel or reddish-brown gravelly soil. It seems likely that this is either the brown sand (E) or the reddish-brown gravel (D), both of which would predate the clay with rust flecks (F). However, it might be remembered that at various points above it was speculated that the dark reddish-brown crumbly clay with gravel might have equated to the brownish gravel

found in the eastern squares which might have been equivalent to the reddish-brown gravel (D). And in 1979, it seemed that in the five-foot grid square N60E5 "yellowish-brown clay mottled with charcoal" (=F) overlay the west wall of F1 (north). It seems safest, therefore, to conclude that the two parts were abandoned at the same period and at a time which certainly predated the deposition of the clay with flecks of rust (F).

A stone in the west profile of T-9 (1980 Figure 19) superficially appears to be aligned with the north wall of F1 (north) as mentioned above (or perhaps with F43 to the east). However, as it interrupts both the charcoal and slag layer (B) and probably the clay with flecks of rust (F) and is covered by the brown loamy clay (H), it is clearly not stratigraphically equivalent to either.

F4 was perhaps the most perplexing and difficult to understand feature on the site, despite being the best preserved. It consisted of two relatively massive walls, one running southwest/northeast, the other running southeast/northwest (Plate 7) which met in grid square N90E10. Both the north/south branch and the section to the east of the intersection were of somewhat slighter construction. Examination of the junction did not elucidate if all three parts had been constructed at the same time. In 1979, the wall fragment in T-7 to the northeast of the stump was designated F9. The east/west branch of F4 was over two feet wide and made of large boulders; the north/south branch was somewhat smaller, about one foot, six inches wide. Both were set in yellow mortar. Both branches of F4 continued outside the area of excavation, indicating the foundation enclosed an area at least 35 by 25 feet. F9 extended 15 feet to the northeast and seemed to end in T-7.

The construction trench for F4 clearly cut into the dark reddish-brown silty clay with flecks of charcoal (A). The top of the stones of the east/west branch were at this level. Unfortunately, its destruction trench obscures the postulated construction trench above

the preserved level of the stones; but it is possible that it also cut through the charcoal and slag layer (B) above the reddish-brown silty clay, as was revealed in N70W10 and N60W5 where a spread of charcoal was uncovered on both sides of F4. Figure 10 also demonstrates that a layer of or containing charcoal was found on either side of the north/south branch of F4. However, in both cases, the charcoal surfaces on either side of F4 were not identical in appearance and composition, so it is difficult to be certain if they are the same layer, cut through by F4, or if they represent charcoal deposited on either side of an existing wall.

While there was no "floor" such as was uncovered within F1 (south), there was a series of complex, obscure and discontinuous lenses of red clay with charcoal, yellow clay with gravel, charcoal, brown loam, very dark gravel with charcoal, etc., which lay uniformly to the north and west of the intersecting branches of F4 directly over the reddish-brown silty clay (A) (Figure 10 and 1980 Figure 6).

There were also two cross-cutting shallow troughs in N100E0, one of which received the feature designation F46, seemingly cut in the charcoal there, which were both covered by the reddish-brown gravel (D). These details may suggest that, rather than F4 cutting through the charcoal and slag layer (B), the charcoal and slag layer proper butted up to it on the south, and a different charcoal layer and series of lenses were created to the north and west of it.

Another problem is raised when trying to establish stratigraphically the date when F4 went out of use. The destruction trench for the east/west branch was quite clearly established in N60W5 to be under the clay with flecks of rust (F). In the middle section, the brown sand (E) overlay the stones directly (1980 Figure 6). For the north/south branch, however, the destruction trench cut through all the layers below the brown loamy clay (H) which overlay the trench and a spread of fill from it extending to the west (Figure 10).

The probable reason for this discrepancy is a period of time between the abandonment of F4 and dismantling of its south wall (the east/west

branch), and the dismantling of its east wall (the north/south branch). Another perplexing point about F4 is that the north/south branch and the east/west branch do not meet in a right angle, but in an angle of about 105 degrees.

Since both F1 (north) and F4 (east/west branch) were covered by the clay with flecks of rust (F), the period of their abandonment was probably the same. The question of the chronological relationship of their periods of construction depends, of course, on whether F4 precedes or succeeds the charcoal and slag layer (B) which F1 was built on or in. The crucial grid square where it had been hoped to examine the two features and their relationship was N70E0. Unfortunately, this square also contained a large tree, one of the Auburn Mansion pillars, F8 and F48 (to be discussed below), and these later intrusions totally obscured the stratigraphic relation between F1 and F4 here. It is worth pointing out the quite different orientations of the two features, but further discussion of their relative chronology will be postponed to the interpretive section.

A narrow stone-lined trough was discovered in 1979 and designated F8. It was found in the 1979 half grid square N60W10, and extended to the southwest beyond the bank of that unit. To the northeast its course was traced to N70E0, and in 1981 what appeared to be its terminus was excavated in N80E10. To the west of the E5 line, it took the form of two parallel rows about 25 inches apart of ovate stones set on edge separated by a floor of smaller stones tightly fitted together, also with the longest axis vertical. Its depth was about ten inches. To the east of the E5 line, the northwest vertical side was absent and the floor stones were somewhat larger. In N80E10, a stone placed on edge seems to mark the end of the trough, as its location was perpendicular to the southeast side. The stratigraphic position of this feature (as for all of the features in the area of and to the northwest of the Auburn Mansion pillars) is somewhat unclear, but it seems that it was in the brown sand (E) (see 1980 Figure 16: the stones in that section are F8; and 1980 Figure 13) and overlaid by the clay with flecks of rust (F). It definitely post-dated the abandonment of F1 (north).

It appeared that its construction cut into the destruction trench for F4, in which case it must have post-dated that as well, although this was not at all clear as the juncture took place in the vicinity of that large tree and there was much root disturbance.

C. 18FR320 Upper Levels

As described above, the milky quartz gravel (F5) and its base layers (G) provided a definite horizon for the site. F5 and the features that are assumed to be associated with it all occur at the interface of the clay with flecks of rust (F), or the reddish-brown gravel (D), or the brown sand (E), with the very dark grayish-brown loamy clay (G). These features include F48, two very large postholes; three smaller unnumbered postholes; three pits designated F30, F33 and F36; and a wall designated F7 (in 1979) and F38 (in 1981). Two anomalous features, one a trench designated F31, one a square pit designated F37, may also be associated.

F48 was given to both of the large postholes directly beside the Auburn Mansion pillars, one first uncovered in 1979 in grid square N70E0, and one uncovered in 1981 in square N80E10. Both consisted of stone rubble packing around a central hole which measured about a foot in diameter. Only the northeast one was excavated: the stone packing which appeared at the level of the clay with flecks of rust (F) was revealed to have been deposited in a pit about three feet in diameter and almost three feet deep, indicating that it had been excavated to support a substantial post.

Two small postholes were discovered in 1979 and a third in 1981. One was in the 1979 half grid square N60W10, south of F8; and two in N60W5. They formed a line extending to the southwest of the Auburn Mansion pillars and parallel with their northwest faces, and were each five feet apart. They also were stone packed, but the cavities for the posts were much smaller than in F48, varying between four to seven inches in diameter. The stone packing also appeared at the level of the clay with flecks of rust (F). In the middle one of the postholes, a post was found which extended up into the brown loamy clay (H).

A narrow rubble wall was encountered in 1979 and designated F7. The same wall was also discovered in 1981, but as it was not immediately identified with F7, it received a separate feature designation (F38).

It was constructed of dry-laid small stones, was about 14 inches wide and one course (six to eight inches) deep. It extended from directly to the northeast of the southwest Auburn pillar where the stones were sitting on the stone packing of F48, northwest to the west baulk of N90W10. Its construction trench cut into the clay with flecks of rust (F) and it was overlaid by the brown loamy clay (H) (Figure 11); it definitely overlay F8, the stone-lined trough in N70E0.

Three pits were found in 1981: in N100W10 where the pit underlay the west baulk (F33); in N90W0 (F36); and in N110W10 (F30) (Plate 8). F36 and F30 were circular, and measured about one foot, six inches and two feet in diameter respectively; F33 was sub-rectangular and measured one and one-half feet long. F30 was a foot deep, F33 five inches deep, and F36 one foot, two inches deep. All were filled with a similar loose humic fill with charcoal and slag inclusions. They all cut down from the reddish-brown gravel (D) or clay with flecks of rust (F) into the reddish-brown silty clay (A), and were covered by the brown loamy clay (G). F30 and F36 formed a line with the northeast Auburn Mansion pillar.

F37 was also a pit, but somewhat different than the three described above. It was located in N90W10, was sub-rectangular, straight-sided and flat-bottomed. It measured one foot, six inches by two feet and was about one foot, three inches deep. It was filled with stones with loose dark humic fill around them. It cut down into the reddish-brown silty clay (A) and in excavation it was thought that it was covered by the clay with flecks of rust (F). However, there was a gap in the wall (F7/38) directly above it, and it is possible that it actually had been cut from the level of the brown loamy clay (H) through the wall. It definitely cut through a trough of yellow clay that was below the wall and postulated to be the base of its construction trench.

Finally, another stratigraphically anomalous feature was F31 (Plate 8). This was a trough varying between one foot, nine inches and one foot, four inches wide and about eight inches deep. It was traced from the

northern baulk of N110W10 along a course to the southwest of and converging with the north/south branch of F4, as far as the N90E10 square. In that 37 feet, its bottom depth dropped (from north to south) over one foot, six inches. It was cut into the reddish-brown silty clay (A) and in N110W10 was overlaid by the brown loamy clay (H). However, further south, as can be seen in Figure 10, it was overlaid by some of the discontinuous lenses noted in this area, including that from the destruction trench of F4. However, it still cuts through the reddish-brown gravel (D). It was filled with slag in a dark grayish gravel.

As can be seen in 1980 Figure 6, and as described for both the north and south of 18FR320, a thick layer of dark grayish-brown loamy clay (H) covered the entire site. In 1981, even where the pre-excavation surface remained (which it did in parts of N30E25, N50W5, N60W5, N70E10, N80W10, N80E10, N90W10 and N110W10), it was generally quickly shovelled off to this surface without much note being taken of the levels. In 1979, it was established that the general sequence for the upper levels was one of a reddish-brown topsoil over a yellow sand over a dark brown sandy humus over the brown loamy clay (H) (1980 Figure 6). Two horizons within this sequence should be further discussed. A layer of asphalt or black-top over a macadam surface was encountered at the interface between the humus and the brown loamy clay (H), in an area at least as far north as the southern border of T-7 (1980 Figure 16), as far east as T-3 (1980 Figure 6), as far west as T-9 (1980 Figure 19), and as far south as the N55 line between E30 and E40 (1980 Figure 8).

The other significant layer was one of large, rounded cobbles and stones up to two feet long between the dark brown sandy humus and the loamy clay (H). This layer was found in the northeast half of T-4 in 1979, and in N30E25 in 1981.

D. Determination of Site Boundaries

As previously mentioned, one of the goals of the 1981 excavation season was a more accurate determination of site boundaries. It was further noted that the strategy adopted for satisfaction of this goal involved the use of machine excavation of narrow trenches extending north, east, and south from the area excavated in 1979. Briefly, these investigations involved the machine excavation of four elongated trenches; one extending into the Auburn Dam to the north; two extending to the east of the excavation area; and one located to the south of the highway drainage ditch. The stratigraphy noted in these trenches was, where possible, correlated with that in the area excavation, and also in the machine trenches of 1979, to define the boundaries of the significant layers and features of 18FR320.

1. The Auburn Dam Trench and the North

A trench extending through the south face and into the interior of the Auburn Dam was excavated in an attempt to define the northern boundary of site 18FR320, to reveal a representative profile of the dam and its interior basin, and to permit a determination as to the presence or absence of structural features pre-dating construction of the dam. Due to the presence of numerous natural obstructions, especially trees and stumps, together with the necessary width of the trench itself, it was possible to excavate only one trench through the embankment of Auburn Dam. Beginning at a point 130 feet north and eight feet east of N030, the trench extended northeast (perpendicular to the face of the dam) for a distance of 70 feet (Figure 3).

Under close archeological supervision (Plate 9), the backhoe cut first through the face of Auburn Dam and worked toward the interior of the impoundment. The resulting section, illustrated in Figure 9, revealed that the dam had been constructed upon a charcoal surface which is postulated to be the northernmost manifestation of the charcoal and slag layer. Below it was the layer postulated to be equivalent to the dark reddish-

brown silty clay with flecks of charcoal. The layer of charcoal and slag disappeared about 35 feet from the face of the dam, and this is considered to be the northernmost extent of site 18FR320. No evidence of structural features was encountered, and no artifacts were recovered.

Contrary to expectation, the surface upon which the dam had been constructed, which showed no signs of preparation, rises in elevation toward the interior of the impoundment before gradually leveling off near its center. From a point beneath the face of the dam to a point approximately 38 feet to the north, the surface of natural or undisturbed subsoil rises in excess of four feet. The manner in which the dam had been constructed was readily discernible from the exposed face (Figure 9). The embankment was comprised principally of an earthen embankment faced with stone, the two being separated by a deposit of packed stone rubble. Lying against the foot of the facing stones, presumably as a reinforcement, was a smaller embankment of the same material as that on the interior of the wall.

The area within the confines of the embankment was marked by an accumulation of clay measuring approximately two feet in thickness and covered by a six inch layer of loamy topsoil. The clay, together with occasional lenses of gravel, is undoubtedly a result of sedimentation during the period in which Auburn Dam was in use. No artifacts were recovered from these deposits.

Lying directly beneath the deposits of charcoal and slag is undisturbed subsoil. As can be seen in Figure 9, this subsoil extended without variation to a thickness of at least seven and one-half feet. Subsoil here, as beneath site 18FR380 in general, is comprised of dark reddish-brown siltstone or mudstone which is thought by Fauth (1980:14) to be of the Newark group and of Triassic age.

2. The West

On the west, the immediate proximity of the ditch and berm of U.S. Route 15 prevented pursuing the numerous features which extended in that direction, including the water channel, F44; the stone embankment to its south; the east/west branch of F6; the east/west branch of F4; the stone-lined trough, F8; the north/south branch of F4. These features made it clear that the western boundary of the site must be under the road.

Trench 6B in 1979 encountered a "trough-shaped depression cutting through deposits of charcoal and shale," the bottom of which was lined with large stone rubble (John Milner Associates 1980:25). It is hypothesized that this could have been F4, in its destruction trench (the other possibility is F31). Machine trench 7, excavated by Kenneth Orr in 1979 in site 18FR331 (Figure 3), apparently cut through a "retaining wall" as well as some sort of trough (Feature 1: thought to be a race) to its west (Orr and Orr 1980:94 and Figure 40). By its alignment, the "retaining wall" could well be a continuation of F4 (north/south branch). If true, this would also extend the site boundaries of 18FR320 in this direction.

3. The East Trenches

Two trenches, each measuring approximately four feet in width, were excavated with the aid of a backhoe to the east of the area excavated in 1979 (Figure 3). The first of these extended from point N15W10 to point N15E60, and the second from N30E25 to N30E68. In each case, machine excavation extended to an initial depth of three to four feet.

It was soon realized, however, that this depth was insufficient for the testing of site boundaries due to the thickness of various fill layers and a significant drop in the elevation of historic grade. Accordingly, a cut nearly eight feet deep was excavated at the east end of the N30 trench and a profile drawing made of the south face of the exposed soil. This drawing is reproduced herein as Figure 13.

Two thick and distinct layers of fill, one a mixture of yellow clay and gray soil and the other composed of decomposing reddish-brown shale or mudstone, extended from the surface to a depth of approximately three feet. A third layer, separated from those above by a thin band of dark gray plastic clay, was comprised of quartz pebbles in a brownish-yellow matrix and is also thought to have been deposited as fill. While it is likely that the uppermost of the two layers are a result of modification in grade stemming from the construction of present-day Route 806 and U. S. 15, together with attendant drainage ditches, the third layer may have been deposited as a result of earlier road or even railroad construction--possibly the earlier alignment of U. S. 15.

At a depth of approximately three feet, six inches below the existing surface, a deposit of dark brown clayey sand, equivalent to the clay with flecks of rust was encountered. The stratum is here about six inches below the same layer as encountered in N30E25. The layers below it are not closely equivalent to those encountered in the area excavation. The heavy layer of slag which was below this layer in N30E25 had been encountered in this N30 trench, but had not extended beyond its intersection with T-3, about 17 feet to the west of this profile.

Worthy of note is that a piece of flat cast iron was collected from the lower layer of dark reddish-brown sand. The dark reddish-gray clay beneath appears to be the natural subsoil in this area, the surface of which is seven feet, three inches below the surface of natural deposits in the dam impoundment. All this affirms that in the historic period, the area to the south of the stone embankment was then, as it is now, a very low-lying area, and that there has been considerable build-up of overburden. There were no structural features or working surfaces in these deposits, however; most notably, there was no trace of the rock platform or its hard-packed ferrous slag surface.

Accordingly, while that feature clearly extended beyond the baulk of the area excavation at E55, either it ended to the northwest of T-N30 or turned from its southeast course to head directly east. F44 also continued outside the area of excavation to the east, as did F45.

To the east of 18FR320, the presence of the heavy layer of slag fill, as much as seven feet thick, which was noted in Kenneth Orr's tests (1, 2, and 3) of "Check 3" (18FR320) in 1977 (Orr and Orr 1977:8-10, Figure 4), and again in T-2 in 1979, made the investigation of this area difficult.

A rubble wall designated F2 was located at the south end of T-2, apparently at the surface of a "reddish brown crumbly clay" (John Milner Associates 1980:9), which may have been the same as that described directly overlying the walls of F1 (south) or may have been the red shale with slag inclusions which overlay F45. In any case, it seems to imply that the activities of 18FR320 may have extended as far as this point (about 65 feet east of the 0 line).

4. The South Trench

In order to further define the south boundary of the site, a narrow trench was excavated by a backhoe in the area lying to the south of the drainage ditch which runs between U. S. 15 and Route 806. This trench was excavated along the east side of a line stretching for a length of 20 feet from a point 145 feet south and ten feet east of NOEO (see Figure 2). The location selected is adjacent to the south edge of a former fish pond in a low-lying and somewhat marshy area.

Excavated to a depth of approximately five feet, the exposed soil proved to be very similar to that described by Orr and Orr (1977:7) in their earlier exploration of this area. That is, the surface is marked by a thick black organic accumulation of topsoil, beneath

which is a yellow sandy clay containing occasional large stones. This deposit appeared very homogenous and contained neither artifacts nor visible evidence of iron-working activity. Accordingly, it is estimated that the south boundary of site 18FR320 is either coincident with or slightly to the north of the aforementioned drainage ditch.

In summary, the perimeter of site 18FR320 can be defined as follows. While the area to the south of the stone embankment was clearly utilized for the deposition of slag from E5 at least as far east as E40, the rock pile itself seems to have been the southern limit of activity areas and structural remains. Most of the significant features of 18FR320 continued beyond the western baulk of the excavations, and site 18FR320 must have extended, perhaps for a considerable distance, under U. S. Route 15 to the west and northwest. Directly to the north, charcoal bearing layers extended under the dam, but no structural remains were located. To the northeast and east, no satisfactory boundary has been established between site 18FR320 and the conjectured forge, while to the southeast, the site features again extended beyond the bounds of the excavation.

Stratigraphically, the historic iron-working levels at site 18FR320 are those soil layers and features between and including the dark reddish-brown silty clay with flecks of charcoal, and the mottled dark grayish-brown clay with flecks of rust and charcoal.

V. ARTIFACTS ANALYSIS AND FUNCTION

A. Analysis

Excavated artifacts from both the 1979 and 1981 excavations are cataloged in Appendices II and III. Both groups of material from the two seasons share common characteristics; a high proportion of cast and wrought iron artifacts was found in relation to the numbers of other kinds of artifacts. A great deal of effort has been expended by historical archeologists in attempts to define patterns in the ratios of the different kinds of artifacts found on historical sites. Notably, in the Carolinas Stanley South has defined various kinds of artifact patterns (South 1977:83-164), and other researchers have tried to develop site patterns in other areas (Tordoff 1979: 38-47; Parrington 1980:161-176).

As a methodology, South's concept of defining artifact patterns could be applied to 18FR320. The specialized nature of the site as indicated by the documentary evidence and the artifactual evidence suggests that such an approach would produce a distinctive pattern. The value of that pattern for the Catoctin site, however, would be limited by the difficulties experienced in identifying the function of many of the cast iron artifacts which for the most part were featureless fragments of flat iron. Other problems would be created by the difficulty of distinguishing between artifacts being made on the site and those being used to make artifacts on the site. Given these problems, which for the most part can be attributed in general to the lack of research on areas of ancillary activity away from the more spectacular furnace remains, it would appear undesirable to attempt to define an iron working site artifact pattern for Catoctin.

Despite the problems of identifying many of the iron artifacts, a reasonably good interpretation of the industrial processes which were taking place on and in the vicinity of the site can be made. These interpretations are based on the presence of certain distinctive kinds of artifacts which are waste products of iron casting. Iron

casting is an important aspect of the industrial process by which iron ore is converted into a finished product. The presence of gate metal (sprues, wedge gates, and runners) indicate the kinds of casting activities which were going on at the site. Finds of broken and imperfect castings indicate the range of cast iron products being manufactured.

The recovery of various tools during the excavations suggests that the cast iron artifacts were trimmed of waste metal and in some cases assembled at or in the vicinity of the site. Evidence was also recovered for the production of wrought iron artifacts to be used in assembling cast items. Wrought iron, which would have been used for other purposes such as horseshoes, ox shoes, and wagon parts, was also found, suggesting a blacksmith's shop might have been in the area of the site. Evidence for non-industrial activities in the form of ceramics and glass bottles was found which may relate to the workmen who were employed at the site.

Most artifacts from industrial sites have, in general, what has been defined as a technomic function (Binford 1962:217-226). That is, their function is strictly utilitarian and designed to counter a problem imposed by the environment. Tools are a good example of technomic function in that they extend the capabilities of the human hand and brain in order to carry out tasks which would be difficult or impossible without them. Tools are used to produce other kinds of artifacts such as structures, machinery, and household equipment of one kind or another. Industrial buildings and machinery will usually have a technomic function, but some of the artifacts they produce may have a socio-technic function (Binford 1962:217-226).

On an iron casting site, stoves with elaborate designs (cf. National Heritage 1975:Plate 3) which have no utilitarian purpose may have a socio-technic function when they are sold and displayed by the customer in a social context. Likewise, stoves with elaborate religious motifs cast onto them (cf. Mercer 1961:Plate 1, et al.) have a similar social context, but because of the subject matter displayed on them,

they have an ideo-technic or religious function (Binford 1962:217-226). Ceramics found on a site may be plain and utilitarian, indicating a technomic function, or may be finer and decorated suggesting a socio-technic function. The evidence of the excavated artifacts at Catoctin indicates a strong technomic function for the site with little evidence of non-utilitarian items. Apart from simple moldings around the edges of some fragments of flat cast iron there were no iron artifacts with any decorative motifs.

The vast majority of surviving eighteenth and nineteenth century stoves are elaborately decorated and this fact probably gives a misleading impression of their relative frequency in relation to plainer stoves. As Deetz has pointed out (1977:6-7), what has survived from the past cannot be regarded as a representative sample, as the more aesthetically pleasing artifacts may acquire heirloom status and be saved, whereas the commonplace is discarded. There is some evidence for socio-technomic function in the ceramics from Catoctin insofar as a small amount of pearlware and whiteware was found. What may be more significant, however, are the finds of Chinese export porcelain, conventionally regarded as a reliable indicator of higher social status (Miller 1980:3). The other excavated evidence from 18FR320 indicates that the main focus of the site was industrial and the finds of high status ceramics are anomalous. It is possible that these sherds are from trash deposits associated with the Auburn Mansion a little to the west of the site. Their linear distribution along the driveway leading to the mansion tends to confirm this hypothesis.

B. Function

Four main categories of artifacts were recovered during the 1979 and 1981 excavations; ceramics, glass, wrought iron, and cast iron. Ceramics and glass form a small proportion of the artifacts from the site, and most of the sherds came from fill layers or from the area of the driveway to the Auburn Mansion. With the exception of a number of fragments from a redware bowl found in the raceway (F44), most of the ceramic and glass artifacts were very small in size and interpretation of their function is difficult. Four main types of ceramics were identified, redware, gray salt-glazed stoneware, whiteware, and Chinese export porcelain. Redware formed the largest ceramic percentage, much of which was glazed either with a clear lead glaze or with a dark, metallic brown manganese glaze.

Chinese export porcelain sherds formed a small percentage of the ceramic assemblage from the site. Many of these sherds appeared to be from plates and were decorated with blue or white motifs. Unfortunately, the small size of these sherds made it difficult to identify the designs on them, which might have allowed an estimate of their date range to be made.

Gray salt-glazed stoneware formed another small component of the ceramic assemblage. Most of these sherds were small and plain but a few were decorated with cobalt blue designs. Whiteware formed a larger percentage, together with a few sherds of green-edged pearlware and blue-edged pearlware. Some of the whiteware was transfer printed and some sherds of annular decorated and machine-turned whiteware were found. Most of the whiteware and pearlware sherds were probably from plates, mugs, and cups, although their small size makes a positive identification impossible in most cases.

The glass assemblage was comprised of window glass and bottle glass sherds, with window glass predominating. Most of the window glass was aqua-tinted and of uniform thickness measuring less than one sixteenth of an inch. The distribution of the window glass was

concentrated around the northeast and southeast walls of Feature 1, suggesting they originally formed the windows of this structure. Much of the bottle glass was from clear glass bottles with a few sherds of dark blue and green wine/beer bottle glass. Some relatively modern clear and amber bottle glass was also found. Few diagnostic features were found on the bottle glass with the exception of a base sherd from a green glass bottle which had a pontil mark.

The function and relationship of this material to the industrial site can be explained in two ways. It is envisaged that some of this material may be defined as "primary refuse" or material discarded at the place where it was in use, and "secondary refuse" or material dumped at a place where it was not in use (Schiffer 1972:161). The window glass around Feature 1, the fragments of redware bowl, and possibly some of the other sherds of ceramic and glass may be defined as primary refuse in use on the site. The majority of the ceramic and glass sherds were very small in size and were perhaps from refuse or midden deposits which were brought onto the site in fill layers and thus would be classified as secondary refuse. The high status nature of the Chinese export porcelain has already been remarked on and the possibility that this material came from the Auburn Mansion reinforces the interpretation of some of the glass and ceramic as secondary refuse.

Objects of wrought iron formed a high percentage of the artifacts found during both seasons of the excavation. These objects fall into three categories; hardware, which includes nails and unidentifiable scraps of iron, tools, and composite wrought iron objects which were riveted to cast iron artifacts. The largest percentage of the three was hardware, most of which was made up of nails. Many of these nails were badly corroded; those that could be identified were wrought or cut nails. Spikes of various sizes formed part of this group. Other miscellaneous iron artifacts included chain links, hinges, iron hooks, strap iron, horse and ox shoes, and nuts and bolts.

Some of the wrought iron nails and other hardware is presumably building debris from the wooden components of the structures which stood on the site. In view of the evidence for flask casting at the site, which is discussed below, it seems likely that some of the nails and other hardware may be from flasks. Wooden flasks would have been nailed together and some of them would have had hinges. Iron and wooden flasks would have been closed with hooks and eyes, and some of the smaller hooks from the site may have served this function (cf. Spretson 1878:Plates XXVII and XXXI). The horse and ox shoes would have served the needs of the large numbers of draft animals documented at the site which were used to haul finished goods to the various markets (National Heritage 1975:10), and to transport ore and fuel to the furnace (Thompson 1976:105). Some of the chain links and hooks found may also be related to transportation as wagon or harness parts.

Other items of relevance to this aspect of the site were two large wrought iron artifacts identified as skeins from a tar skein axle for a large wagon (Donald Berkebile; Smithsonian Institution: personal communication). These artifacts were designed to strengthen the wooden axle of a cart, were rounded to fit round the axle, and had square holes for a linch pin at one end and a groove for an iron restraining band at the other. A wagon box was also recovered, but this was a cast object and will be discussed below.

Hand forged butterfly nuts and bolts, usually of one-half inch diameter with square heads, were relatively common finds. These artifacts are identical with the type of hardware used to bolt eighteenth and nineteenth century stoves together (Mercer 1961: Plates 7 and 8). A backplate of flat iron was placed on the inside angle formed by two plates and the bolts were pushed through the plate and through a rounded cast gutter-shaped piece of iron. The gutter-shaped iron covered the joint and the butterfly nuts formed an external decorative element.

A variety of wrought iron tools were found which included cold chisels, punches or drifts, files, wrenches, slickers, a hammer, and a draw knife (Plate 10). With the exception of the draw knife, which had the maker's name "AMES" on it, all of these tools were probably made by a blacksmith. The draw knife was a tool used by woodworkers such as carpenters, coopers, and coachmakers; a wide variety of different kinds were used, each designed for specific tasks (Wildung 1957:54-55). The Ames Manufacturing Company was organized in Massachusetts in 1834 and is still in business today (Herskovitz 1978:64).

The cold chisels from the site ranged from four to eight inches in length with some possibly broken examples which were around two and a half inches in length. Widths ranged from three quarters of an inch to two inches with thicknesses of three eighths to three quarters of an inch. Most of the 21 examples identified had burred ends, indicating heavy usage. Cold chisels and hammers were the implements used for trimming gate metal from castings (Spretson 1878:368-369) and this may have been their function at 18FR320. Blacksmiths also used a variety of cold chisels (Albright and Souder 1974:30), but the basic similarities in the Catoctin chisels and comparative data from other ironmaking sites (Crossley 1975:Figure 30) suggests that they relate to the trimming of castings.

The presence of blacksmiths in the area of the site is, however, indicated by a number of other tools and it is not unlikely that they used some of the chisels. A number of small wrought iron punches were recovered during the excavations and it seems very probable that these are blacksmith tools. A side set hammer from the site is of a distinctive type used by blacksmiths for working an inside corner or welding two pieces of iron at right angles to each other (Richardson 1978:Vol. 1; Figure 180 No. 53; 188). The files, too, may have been used by a smith, but the relatively large number of these (eight) may be an indication that they were used for finishing castings.

A fragment of a wrought iron wrench which may be associated with stove assembly was recovered. The wrench head was square like many of the

bolt heads from the site. A number of fragmentary trowel-like tools were also recovered during the excavation. These are identified as slicks which were tools used for smoothing molds after the pattern had been removed (Spretson 1878:Plate XXVII; Clemens 1924:Section 70; 31). Many fragmentary pieces of wrought iron may also represent portions of tools, but identification of them was not possible due to their small size and heavy corrosion. One very large object, an iron bar one foot, six and a half inches long with one round and one pointed end was recovered. The function of this artifact is uncertain; it may be a tool or some kind of building hardware. Another enigmatic object was a wrought iron staple-like object with dimensions of seven inches by two and a half inches. Again, no precise identification could be made of this object which may also be some kind of building hardware.

Three examples of composite cast and wrought iron objects were found. These consisted of angular fragments of cast iron with wrought iron bars riveted on them (Plate 11). These may be bases or plinths for large iron cooking pots (cf. National Heritage 1975:Plate 6). Alternatively, they may just be parts of stoves which had wrought iron legs on an angular cast iron body. No parallels for stoves of this pattern have been noted, but of the wide variety of stoves produced, many had wrought iron components in their stands or feet.

Cast iron formed a large proportion of the artifacts from Catoctin. Much of this material was flat, featureless cast iron, probably from plain stove plates. The only examples with any kind of decoration were those which had moldings of some kind around the edges, which presumably were to mask the joint between two plates. Two fragments with door latches were found in which the cast iron latch had been riveted on with a wrought iron rivet. One fragment of a cast iron door frame was also found with a wrought iron rivet forming a catch for the door fastener. Several fragments of cast iron feet were found which bore a strong resemblance to the feet on a stove known to have been made at the furnace in 1786 (National Heritage 1975: Plate 1). One fragment of flat cast iron had the numeral 3 cast

onto it. This may have been a pattern or size number; such numbers are found quite often on stoves, usually in some inconspicuous place or sometimes in a prominent place (cf. Pierce 1951:Plate 121). Some of the flat cast iron had rounded molded edges, suggesting that these examples came from the rounded base plate of a Franklin-type stove (cf. Kent 1976:Plates 7 and 8). The overwhelming impression indicated by the artifacts associated with stove manufacture was of plainness and utilitarianism with no evidence of elaborately decorated stove plates.

Other evidence of casting was indicated by fragments of cooking pots of various sizes. Many of these pots were represented by fragments with feet and a semi-complete example excavated in 1979 which has three feet and an iron handle may be a representative example of this type (John Milner Associates 1980:Plate 15). Two examples, each with a triangular handle ear, were noted (Plate 18). Handles and feet varied in shape from round to triangular. The pot from the 1979 excavations had a casting scar from a circular sprue. It was more usual to cast pots with a wedge-shaped gate as these were easier to break off than the circular sprues (Tyler 1976:223). Another type was represented by an everted rim sherd with a perforated lug for the bail attachment.

Apart from stoves and hollow ware, there were indications of other kinds of casting activity. A rectangular block of iron measuring approximately five inches by three and a half inches by two and a quarter inches with a circular groove in it was found. This is interpreted as a bearing block of some kind. A fragment of iron with cogs on it and some indications of a curve on the opposite side to the cogs appeared to be part of a gearing wheel (Plate 12). A casting scar on this artifact indicated that it had been cast in an open mold. Excess metal in the cogs and the remains of a runner on the inside of the gear wheel is evidence that the casting broke before the trimming of gate metal and finishing of the artifact was completed.

Another distinctive artifact was a cast iron wagon box with the remains of a runner attached (Plate 13). This, too, was cast in an

open mold and had not been trimmed or finished. The casting had a bad blow hole on one side which was probably the reason why it had been rejected and not finished. A fragment of a very large hollow-ware vessel with a large trunnion handle was also excavated. The function of this vessel is uncertain, and it is difficult to speculate what it may have been used for.

Some evidence of cast iron artifacts which were probably used in the casting process was found. Examples of cast iron flask clamps designed to hold the two halves of a flask mold together (Plate 14) were found (Clemens 1924:Section 69; 20-21). Other items of cast iron are interpreted as gaggers which were used to reinforce the sand in large molds (Clemens 1924:Section 70; 19-20). The flask clamps from Catoctin are similar to those in use in modern foundries; the possible gaggers found were cast as right angled bars of iron, but other forms were in use depending on the kind of casting being made.

Three kinds of waste or gate metal from the casting process were found. In casting it is always necessary to have a channel for the molten metal to run through into the mold. In open molds the channel will be a groove formed in the sand and the gate metal will be rounded on one side and flat on the other. The gate metal from this kind of casting is called a runner. Several examples of runners were found including one with a stem and a number of branches, indicating multiple casting of objects (Plate 15).

In closed molds or flask molds, the channel or gate was either a tapering cone or sprue (Plate 17) or a wedge-shaped gate or wedge gate. Examples of both kinds were found at Catoctin with wedge gates being the most common. Forty-nine gates were identified as wedge gates against a total of 24 sprues.

It is not impossible that some of the gate metal recovered should be interpreted as vents for air and steam to escape from the mold

cavity and for the molder to verify that the cavity was filled with molten iron. However, it is likely that green sand molding, as discussed in Chapter III, was the practice here since it was common at this time, and green sand molding generally did not require vents as the steam escaped through the sand (Overman 1872:45).

C. Analytical Program

The questions which prompted the program of analysis of slag, waste, and finished iron artifacts recovered from the 1981 excavations were outlined in the Introduction. To recapitulate, the fundamental aim of the slag analysis was to identify the metallurgical process which produced it; the fundamental aim of the metal analysis was to identify the type of iron produced and its effectiveness for certain purposes.

Slag Analysis:

Eight samples of slag were selected for analysis, including examples of the heavy rusty frothy type (ferrous slag), a greenish glassy variety (glassy slag), and one example of an earthy type. The contexts from which these samples were selected included the fill of F44, the hard-packed slag surface, the compact slag south of the stone embankment, the mixed slag and charcoal layer (all in the south of the site), and the charcoal and slag area (in the north of the site). The intent was to include as wide a variety of contexts and types of slag as possible in order to check for any change in process over time and years.

The analytical program focused on the identification of the composition of the slags, and on observations of their structures. Quantitative elemental analysis of the major constituents of the slag was obtained from proton-induced x-ray emission spectroscopy (PIXE), which was carried out by Charles Swann of the Bartol Research Foundation of the University of Delaware. A brief metallographic examination was made of polished and mounted specimens of all but Sample 17 by Gerry McDonnell of the Archaeometallurgy Group of the University of Aston in Birmingham, England.

Compositionally and metallographically the slags fall into four groups:

(i) Samples 17 and 18 are green glassy slags with small round vesicles and spherical metallic iron inclusions.

(ii) Samples 6, 7, 11, and 16 have externally an agglomerated appearance with surface corrosion products (Plate 16). In section they vary from gray/black to blue/gray in color and are variably vesicular. Samples 6, 7, and 16 are weakly magnetic, while Sample 11 is strongly magnetic. Under the microscope they present a structure of rounded iron oxide grains, probably mostly wustite (FeO), fayalite ($2FeO.SiO_2$), a glassy phase probably approximating to anorthite, and metallic iron inclusions.

(iii) Sample 15 has an agglomerated appearance, is gray/black in section, heavily vesicular and non-magnetic. Its structure is one of rounded iron oxide grains and fayalite laths in a glass matrix with metallic iron inclusions.

(iv) Sample 10 has an earthy appearance and upon fracturing shows an apparent agglomerated appearance with inclusions of charcoal, silica, and brick. The sample is friable and magnetic. The matrix is a fayalite slag with rounded iron oxide dendrites and some glassy phase.

Identification of the composition of Samples 17 and 18 and comparisons with published slag analyses (White 1980:Tables 2-4; Morton and Wingrove 1969:57)[1] make it virtually certain that these are examples of a fairly typical charcoal blast furnace slag (Table 1).

The other slags are more enigmatic. Dark iron silicate slags such as Samples 6, 7, 11, and 16, are characteristic of a number of iron-working processes, including bloomery production of wrought iron, refining of pig iron to make wrought iron, and remelting or reheating in a variety of furnaces (Morton and Wingrove 1969:56; Hallett 1981). The initial expectation, because of the association of these slags with casting debris, was that they would have been produced in a casting operation in a remelting furnace such as a cupola. In fact, composition and structure strongly suggest that these are refining slags. While somewhat higher in iron and lower in silicon and aluminum

Table 1. Composition of Catoctin Slag Samples

Sample No.	Elemental Composition (% by weight)								
	Fe	Si	Al	Ca	Mg	Mn	P	S	K
6	81.8	8.0	1.16	5.0	≤ 0.05	0.27	1.64	0.050	1.28
7	93.1	2.0	0.13	2.5	≤ 0.05	0.45	1.08	≤ 0.01	0.24
11	89.2	3.5	0.14	4.5	0.45	0.25	0.84	≤ 0.01	0.48
15	65.1	18.2	2.21	7.8	0.60	0.28	0.034	0.029	4.9
16	94.2	3.2	0.27	0.82	0.36	0.31	0.37	0.24	0.056
17	5.1	49.1	13.8	18.2	3.9	1.51	≤ 0.01	≤ 0.01	6.3
18	3.1	46.8	10.0	26.6	5.2	0.58	≤ 0.01	≤ 0.01	5.8
10(S1)	92.9	2.0	0.23	1.15	0.13	0.21	2.41	0.050	0.104
10(S2)	19.6	48.7	13.7	6.3	2.24	0.21	0.079	0.83	6.9
10(S3)	1.4	98.5	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.01	≤ 0.01	≤ 0.05

Description and Contexts of Slag Samples

6	Ferrous slag	N30E25	Compact slag
7	Ferrous slag	N50E15	Hard-packed slag
10	Earthy slag	N40E35	Mixed slag and charcoal
11	Ferrous slag	N90W10	Charcoal and slag
15	Ferrous slag	N20W5	Interface of gray clay and charcoal in F40
16	Ferrous slag	N40E15	Mixed slag and charcoal
17	Glassy slag	N40E15	Mixed slag and charcoal
18	Glassy slag	N40E15	Fill of F44

than other analyzed refining slags (Morton 1963:264 and 267; Morton and Gould 1967:242f.; Morton and Wingrove 1971:27f.), the mineral constituents and their form are equivalent to those expected for slag deriving from the forging process, although whether in a finery or chafery hearth would require further investigation.

The mineral constituents of Sample 15 are similar to those of the second group, but the form of the minerals is different, indicating a faster cooling rate than for the second group. Accordingly, this sample may derive from either the same process under different conditions, or from a different process. The composition of this sample actually bears the closest resemblance to analyzed refining slags. As for Sample 10, it is distinguished by its earthy texture and inclusions, and may result from raking out of a furnace or hearth, which would account for the inclusions of refractory material and sand. Its composition was obtained at three sites on the sample: that at S1 bears a close resemblance to the composition of the first group, that at S2 probably is the fayalite matrix since it closely approximates that constituent's proportion of iron oxide to silica (1:2), that at S3 must have been a grain of sand.

The form that some of the slag took should be noted here as support for its identification as refining slag. As mentioned above, in the area south of F44, the ferrous slag occurred in the form of thick plates up to 18 inches in diameter. These closely resemble identified chafery slag plates called "mossers," where "a simple saucer-shaped hearth sufficed the needs of the bottom, and as the slag formed it overflowed the hearth, and onto the sand floor" (Morton 1963:267, Figure 10).

The initial resistence to the identification as refining slag was strong, because of the difficulties in understanding the association of refining slag and casting debris, the expectation as outlined in the Introduction of finding evidence for a foundry, and other incongruities, not the least of which is the unsuitability of Catoctin-produced iron for refining purposes (as will be discussed below).

Accordingly, a concerted effort was made to discover exactly what remelting (i.e., foundry) slag would have looked like and what its composition would have been.

Unlike historic smelting and refining slags, which have been well-studied, particularly by researchers in England, analyses of early remelting (in reverberatory or cupola furnaces) slags are conspicuous by their absence. The earliest description of cupola slag found dates to 1869. In it, the slags are described as being

> formed of the slag of the fuel, the sand and slag sticking to the pig-iron, particles of the furnace lining, the limestone added, &c.; they are blue, grey, brown, or yellow, vitreous, porcelain-like, stony or earthy (Crookes and Röhrig 1869:608).

Their analysis of a sample of cupola slag in which cast iron was melted with an addition of lime had 1.11 percent iron oxide (FeO).[2] Visual examination of cupola slag from the Highland Foundry site in Roxbury, Massachusetts (1845-1920)[3] confirmed this description, being slag of an extremely diverse nature which contained numerous inclusions, particularly of the fuel (coke). However, it is likely to have contained very much more iron than about one percent. No descriptions or analyses of reverberatory furnace slag have been located.

Cupola slag is likely to have changed quite drastically in nature and composition over the period that cupola furnaces were in use. While later cupolas operated with high lime slags and subsequently saw little loss of iron to the slag (Moldenke 1930:480), it is likely that in earlier cupola operation, the slag might have contained a good deal more iron. Contemporary observers noted the problem of the loss of iron in the remelting process. Overman writes that the loss would be invariably five to six percent with the reverberatory furnace consuming most iron (1872:222). Spretson notes that the "great waste in melting iron in a cupola usually occurs at the zone of the tuyeres" (1878:66), which were supplying the blast and which was where the iron would be most liable to oxidation.

Accordingly, it is not entirely ruled out that Samples 6, 7, 11, 15, and 16 might be early remelting slags. Sample 10, in particular, shares with the Highland Foundry slag and with the 1869 description, an extremely heterogeneous appearance and composition. But given the current state of knowledge of early metallurgical processes,[4] the identification of this slag as refining slag must be accepted, in the absence of any analyses of comparative historic remelting slags.[5]

To summarize, the analysis of the slag revealed the following:

(i) The nodules of green glass slag which were found in the fill of F44 and in most of the other layers on the site are quite clearly slags derived from the primary smelting process in a charcoal blast furnace.

(ii) All the ferrous slag can be provisionally identified as deriving from the refining of pig or cast iron in a finery and chafery forge, with the possibility of changes in the tapping procedure causing differences in cooling rate, creating slightly different structures.

(iii) Only Sample 10 is sufficiently heterogeneous and compositionally anomalous conceivably to have derived from a different process, but probably should be interpreted instead as furnace or hearth rake-out.

Metal Analysis

Ten items of cast iron were selected for the analytical program. They included a sprue or riser (Plate 17), a tripod kettle leg, a handle ear (Plate 18), a section of flat plate, a runner, three wedge gates of different sizes, a gutter or possibly a bad pig, and a fragment of pig iron (Plate 19). Again, the intent was to collect samples from varying contexts, and to examine both finished objects and artifacts representative of stages in the casting process. Because it was initially believed that casting was the only process represented at the

site, the focus of the program was on cast iron. Because it was not conceived that the manufacture of wrought iron might have played a role at 18FR320, no items of wrought iron were studied, a decision now greatly regretted.

Again, quantitative elemental analysis was obtained by PIXE, and supplemented by scanning electron microscopy, which was carried out by Heidi Moyer of Lehigh University. Metallographic examination was carried out by Helen Schenck of the Museum Applied Science Center for Archaeology, University Museum, Philadelphia, with material assistance by Reed Knox, retired metallographer, and Michael Notis of Lehigh University.

Cast irons are a class of iron-carbon alloys which have a sufficiently high carbon content to attain a relatively low melting temperature. Accordingly, they are used to cast objects which can be machined into final form, but may not be subject to plastic deformation. Thus their properties are determined by initial composition and by control of the casting process. Cast irons can be modified by subsequent heat treatment (malleabilizing), but as this process is irrelevant to the Catoctin specimens, it will not be further discussed. Cast irons are classified according to their microstructure, which is dependent on composition and rate of cooling. The crucial constituent is carbon: if the carbon occurs in the form of free graphite, then the iron is gray iron; if it is present combined with iron to form iron carbide or cementite, then the iron is white iron. Mottled iron describes an iron with a structure which incorporates both these phases.

The names of these types derive from their appearance when fractured, which was the only way to judge the quality of pig iron until the advent of the science of metallurgy at the end of the nineteenth century (Sanders and Gould 1976:523). Generally speaking, they were graded by number with No. 1, or dark gray pig iron, being the foundry iron; No. 2, equivalent to mottled iron; and No. 3, or white pig iron, being useful in the refinery but of no use in the foundry (Overman 1872:179-181; Overman 1854:288). Tomlinson identifies the same general categories but with additional subdivisions (1868:914).

With one exception the Catoctin irons were either gray or gray to mottled iron. Only Specimen 14 (pig) was white to mottled iron. The form that the graphite characteristically took in the gray irons was Type A, flakes of random orientation and uniform distribution with some flakes forming rosette groupings (Type B) (ASTM standards A247;1975). The former type is the most desirable in engineering irons (Gagnebin 1957:51). In the gray irons, the flakes of graphite generally occurred in a pearlitic matrix. Pearlite is the eutectoid constitutent which consists of plates of iron carbide interspersed with plates of ferrite, or pure iron, and has a characteristic lammellar structure (Plate 21). The best strength in gray irons is associated with a matrix of pearlite, which gives them high hardness and good mechanical properties (Ungalik 1977:vi).

The other major constituent observed in the gray irons was the phosphide eutectic which has a characteristic conforming shape of a concave triangle (lenslike form). Because it has a low melting point, it is the last constituent to freeze and therefore occurs at the boundaries of the solidification cells (Angus 1978:27). It can be seen in Plate 22.

The formation of white iron depends on two factors: the composition, most notably the percent of silicon, and the rate of cooling. Silicon strongly promotes the formation of graphite, and rapid cooling promotes the formation of iron carbide. Thus, section size of a casting will have an appreciable effect on the likelihood of gray or white iron being produced, since the thinner the section, the faster it is likely to cool (Angus 1978:5). The characteristic structure of white iron is called ledeburite, and is the eutectic mixture of iron carbide and pearlite. It characteristically has the form seen in Plate 23.

Examination of the composition of these specimens (Table 2)[6] shows medium levels of silicon, except in the case of Specimen 14 (pig), where the extremely low level of silicon is obviously the reason for its structure of white iron. Because Specimen 3 (handle ear) has a reasonably high percentage of silicon, the thin section of the piece

Table 2. Composition of Catoctin Iron Samples

Sample No.	Elemental Composition (% by weight) Si	P	S	Mn
1	1.16	0.18	0.035	0.53
2	1.17	0.68	0.057	0.34
3	0.74	0.70	0.062	0.47
4	0.52	0.88	≤0.01	0.68
5	0.42	0.75	≤0.01	0.34
8	0.44	0.96	≤0.01	0.95
9	0.31	0.95	≤0.01	0.83
12	0.36	0.90	≤0.01	1.14
13	0.74	0.91	≤0.01	0.44
14	0.08	0.47	≤0.01	≤0.05

Description and Contexts of Iron Samples

1	Sprue or riser	N40E35	Mixed slag and charcoal
2	Tripod leg	N40E35	Mixed slag and charcoal
3	Handle ear	N30E25	Compact slag
4	Flat plate	N40E35	Hard-packed slag
5	Wedge gate	N40E35	Hard-packed slag
8	Runner	N90W10	Reddish-brown silty clay
9	Wedge gate	N90W10	Reddish-brown silty clay
12	Wedge gate	N90W10	Reddish-brown silty clay
13	Gutter	N80E10	Blacktop and macadam
14	Pig	N30E25	Compact slag

with concomitant rapid cooling must have been responsible for its mottled iron structure (Plate 24). There is quite a range in the level of manganese. Manganese is chiefly important as a neutralizer of sulfur, which is generally one of the worst impurities iron can contain. If sufficient manganese is present, which it is in all the Catoctin specimens, then it will combine with sulfur to form manganese sulfide, and prevent the formation of more harmful iron sulfide (Angus 1978:20). Manganese present in amounts over this tends to promote the formation of pearlite. The iron contained very low levels of sulfur.

Finally, all the iron samples had high levels of phosphorus. The phosphorus content in currently produced gray iron castings is generally less than 0.15 percent (Krause 1968:6). Phosphorus was undesirable in wrought iron, but since it would increase the fluidity and melting range of the cast irons, it would have given them good castability. Kirk notes that "It is generally conceded that an iron for light soft castings should contain from 1 to 2 percent of phosphorus" (1911:110).

In sum, it can be said that these are phosphoric cast irons, almost all gray, the structure of which was one of soft flake graphite uniformly distributed in a matrix of pearlite with an intercellular network of phosphide eutectic. Both the type of the flake graphite and the matrix of pearlite would be the most desirable structures for engineering gray irons. Comparison with other analyzed specimens from North America (Henger 1970: Ungalik 1977) shows a surprising uniformity of structure. Only one of the specimens analyzed by Henger had a ferritic rather than a pearlitic matrix.

It should be noted that the silicon content of the St. Maurice Forges examples ranged between 0.4 to 0.8 percent, and those from charcoal furnaces in Henger's sample had a silicon content of between 0.06 to 0.7 percent. In contrast, the Catoctin samples had a range of 0.3 to 1.1 percent phosphorus (excluding the white iron pig). They therefore fall midway between the irons produced in a

charcoal blast furnace and those produced in a coke fueled blast furnace. The samples from the latter have about a 1.6 to 1.7 percent silicon content (Henger 1970:46f.); Morton lists the silica content in "typical analyses" for charcoal and early coke pig as 0.39 and 2.15 percent respectively (1966:58).

The significance of these variations is that the higher the operating temperature of the furnace, the higher the percentage of silicon which will be reduced and end up in the finished iron (Schallenberg 1975:350). While the level of silicon is not as high in the Catoctin pieces as in coke-smelted iron, it is relatively high compared to cold-blast charcoal smelted iron such as that from the St. Maurice Forges. The very low percentage of sulfur would also strongly suggest that the iron was from a charcoal furnace rather than a coke furnace. Thus, the levels of sulfur and silicon are not incompatible with the hypothesis that the Catoctin examples were produced in a hot-blast charcoal furnace. It cannot be too strongly stressed, however, that variations in percentages of these impurities can be attributable to a number of causes and would depend on how efficiently the furnace was working and what flux was being used, as well as the operating temperature of the furnace.

The high level of phosphorus does definitely indicate that a high-phosphorus ore was the original source of these irons. This is entirely in keeping with the supposition that this iron is from the Catoctin ore banks. In 1911 Singewald described the ore in the Blue Mountain Ore Bank north of the furnaces as a good grade of non-Bessemer limonite with variable manganese content, low sulfur, and high phosphorus--between two to four percent (1911:195f.) A sample from the Auburn Bank south of the furnace and west of 18FR320 had a similar composition with a slightly higher phosphorus level (0.5 percent) (Singewald 1911:201). lower?

What are the general implications of these analyses? It seems a number of points can be made. Most importantly, it is clear that smelting, refining, and casting are all activities of which evidence was found at 18FR320, in the form of the two types of slag and the

casting debris. Smelting, however, clearly did not have the same impact on the site as the other two processes, since only a relatively few nodules of this type were found. In conparison, numerous heaps of slag are found around the standing stack to the north, of which the larges measured over 200 by 500 feet and stood 25 feet above grade (Struthers 1981:46).

It is difficult to be certain of the relationship of the iron and the two types of slag. It will have been noted above that there was an implicit assumption in discussing the iron that it would have been cast directly from the blast furnace and not from a foundry furnace. Fundamentally, this assumption rests on the presumed chronological position of the layers of interest at the site in the first half of the nineteenth century (as will be discussed below), the lack of any documentary evidence for a foundry at Catoctin before the mention of a steam driven foundry in the 1860 Census (see above), and the absence of identifiable remelting slag.

It should be noted, however, that it is not possible to distinguish between iron as cast from a blast furnace and iron as remelted and cast from a foundry furnace. Hallett notes, "when pig iron is remelted in a cupola and even more so in an air (reverberatory) furnace, there is a loss of some 10% in the carbon, silicon, and manganese contents but unfortunately blast furnace iron (pig iron) varies from case to case more than that" (1981). The only point that can be made is that the low sulfur content of the Catoctin irons makes it virtually certain that they could not have been produced from a coke-fueled furnace, whether blast or cupola. While cupola furnaces were generally fueled by coke (Tomlinson 1868:344), they apparently might sometimes be fueled by charcoal (Overman 1854:204). Charcoal was the only fuel found at site 18FR320, with the exception of a very few nodules of coal in upper levels.

It might be asked if the iron could have been produced by the furnace which produced the glassy slag: it could, but it need not have. In other words, there is nothing conclusive which either urges that the slag and metal are related, or makes it impossible for them to have been associated.

A much trickier point is what the association of the refining slag and the casting waste means. One possibility is that the gate metal was being refined to wrought iron in the finery and chafery. It does not seem that this practice would be metallurgically unfeasible, but it must be admitted that it does not appear as suggested practice in any of the contemporary manuals. Perhaps it is as simple an association as the forge being next to the shed or structure where castings were finished or fettled, so that waste and scrap from both establishments tended to be carted off together.

The last possibility is that there actually was a foundry furnace in operation in conjunction with the forge, and that there was simply very little slag produced by it in comparison to the volume of slag produced by the forge. The reference to the forge where castings were made might be remembered at this point (discussed above in Chapter II), and a comparable site might be the nineteenth century Potts and Wilson Iron Foundry/Forge at Matildaville, Virginia.[7]

Finally, the point that is the most difficult to resolve is the refining process. High phosphorus "cold-short" pig iron was difficult to work in the finery and would produce a brittle cold-short wrought iron. "Metals which contain phosphorus or sulphur are not adapted for the charcoal forge," writes Overman, "because of the inferior iron they produce, and because of the amount of time consumed in converting them into bar iron" (1854:281). Thus, while the high phosphorus iron would have been superior for the production of thin-sectioned castings with fine detail, such as stove plates and hollowware, it would

not have produced good quality wrought iron. This discrepancy cannot be resolved. It might be suggested that what is evidenced at 18FR320 is an experimental try at refining which was abandoned when the wrought iron produced proved to be not of acceptable quality. A test of this hypothesis would include the analysis of some of the wrought iron found on site.

A last point to be discussed is the identification of the flecks of rust in the clay overlying the site. It was initially believed the flecks might represent "hammer scale," the slag which forms in thin scales during heating of bar iron under oxidizing conditions prior to rolling it or working it under a hammer (Tylecote 1962:254). It was also called "mill scale" and as discussed in Chapter III, it would be expected in forges and smithies. It was postulated that the clay with flecks of rust may relate to a period when site 18FR320 was called the "forge field" (John Milner Associates 1980:7), and when it was believed a forge dating to the second half of the nineteenth century was in existence to the east of the site.

However, survey of comparative examples suggests strongly that hammer scale in the immediate vicinity of the hammering or rolling would build up in relatively thick concreted slabs (Tylecote 1962: 254; "scoria" in Lenik 1974). The flecks of oxidized iron in the clay may be from sparks of flying iron, but they are not equivalent to those slabs or crusts.

VI. SITE INTERPRETATION

The significant features and soil layers of 18FR320, and their stratigraphic relationships, were described in Chapter IV; and the collection of artifacts from the site as a whole was identified and analyzed in Chapter V. The background to nineteenth century iron technology, including smelting, founding, refining, and working, was discussed in Chapter III. In this chapter, stratigraphically and artifactually determined site phases will be defined and the processes occurring in the phases identified. Finally, an attempt will be made to equate those phases with the documented history of Catoctin outlined in Chapter II. Throughout this section reference should be made to the phase maps, Figures 14 through 18.

A. Phasing

Phase 1a (Figure 14)

The earliest utilization of 18FR320 seems to have been in connection with the water channel, F44, running through the area downhill from west to east. This water channel is postulated to be a raceway and its purpose would have been either to direct the flow of water towards a waterwheel to power some operation (head race), or to channel the water coming away from a waterwheel (tail race), or conceivably both. It probably was created by channelling water from an existing stream. Examination of large scale contour maps of the area reveal that a watercourse (probably that currently running in the drainage ditch to the south of 18FR320) originally dropped down from the slopes of the mountain almost directly to the west of 18FR320 to join with Little Hunting Creek some 1,600 feet to the east of Maryland Route 806. The raceway must have been divided from the stream to the west of 18FR320, with the diminished stream continuing east to the south of the raceway. The stone embankment obviously was designed to build-up and buttress the south bank of the raceway, dividing it from the streambed, and so must be contemporary with it.

Certain features suggest that F44 functioned as a head race. F40, the water channel encountered at the west end of F44, should probably

be interpreted as a sluice, designed to control the volume of water passing down the main raceway by diverting excess volume to the south back into the stream. The height of the floor in the "break" in the stone embankment was one foot, three inches above the floor of F44 at that point, which suggested the usual depth of the water in the race would be about one and a quarter feet. Above that level, it would spill into the "break" and drop down into F40. Through the measured comparison of elevations along the bottom of the raceway (F44), it was possible to calculate an approximate slope for this feature as it dropped from west to east. As a cautionary note, however, it is important to note that variations in the depth of the race may render the resulting figure inaccurate. As Evans (n.d.:118f.) noted, it was important for those employing water power to maintain a constant volume and velocity of water in a raceway, a process which often necessitated modification to depth and width in accordance with natural obstructions. An ideal velocity was felt to be one to two feet per second, but the slower the better. Using the standard formula for calculating the percent of slope, dividing the vertical drop by the horizontal distance, the slope of the raceway at site 18FR320 was determined to be approximately 3.3 percent, a figure which seems quite high.

The slot (F39) beside F40 might be something like a beamslot for a water control mechanism (sluice gate). The finds of some 250 nails and nail fragments in the clay at the top of the stone embankment right at the west of N30W5 may suggest the former location of a wooden mechanism or machinery related to the sluice.

The three stone features spaced along the south wall of the raceway might have served as supports for posts, with the finds of wood in the fill of F44 being the remnants of a flume.[8] Both posts and planks were found. It is tempting to see the post found at the edge of the stone embankment in N30E15 as being connected as well, but it is preserved to such a height that it is probably much later.

The profile of the race fill suggests deposition in two stages: the edges and the middle. This might be accounted for by the following sequence: the race uniformly silted up with the mottled clay seen at either side, a narrower channel was dug or dredged out, and that, too, in time silted up. In was not, however, possible to detect any real difference in the pattern of deposition in wood or artifacts in those two contexts, so this sequence is speculative.

At the time the raceway was open, and at the time it was silting in, the area to the south of the stone embankment was probably an open, low-lying, somewhat swampy area with the stream flowing through it.

Phase 1b

Subsequent to the silting of the race, it is postulated that the reddish-brown silty clay with flecks of charcoal (A) was laid down to the north of the race. This layer is somewhat enigmatic. It closely resembles the reddish-brown siltstone or mudstone which is the natural subsoil. Generally speaking, the surface of the stratum did not have the appearance of a surface being walked on and on which artifacts were being dropped. Moreover, artifacts within the layer tended to be dispersed through the upper few inches. Only in one square (N70E10) did a possible surface seem to be defined by a scatter of stones and artifacts lying at a uniform depth in the layer. This "surface," however, was two inches below the top of the stratum, and not demarcated by any change in color or texture. The layer seems best identified as a fill layer, possibly brought on site for levelling purposes before construction of F4, although it must be admitted that this explanation is not entirely satisfactory.

In sum, then, not much was occurring at site 18FR320 itself at this time, though one can envision quite a lot of activity off-stage, as it were. Obviously, some process requiring water power was in operation to the east of the site. At the end of this period, it seems the area to the north of the site began to see some use,

possibly with a fill layer being brought on site. Perhaps the most important point to be made about this phase, and one which will be expanded upon subsequently, is that while there were a few nodules of glassy slag, there was virtually no ferrous slag found in the lower levels of the race fill, in marked contrast to the layers relating to the next phase.

Phase 2a (Figure 15)

Subsequent to the silting up of the raceway (F44), a large number of rocks were purposefully brought in and laid down in an elongated rectangular platform, superimposed on the race fill and on the reddish-brown silty clay. The purpose for this is unclear, but it might be postulated that it was intended to serve as a causeway over what must have been a low-lying wet area. This hypothesis presupposes the continued existence of some functional locus to the southeast or east of the site (since the causeway did not appear in the N30 trench), as well as one either to the northwest or possibly directly on site, since the causeway ends 12 feet from the western edge of the trenches. Describing the rock platform as a causeway implies some type of passage along it, and this supposition is supported by what might be a worn and hardened path along the center of the rock platform (as in N40E25 and photographed in Plate 2), where there is a gap in the rocks and a very compact surface with many pieces of wood.

The existence of this layer also might suggest a slight time lag before the hard-packed slag surface was deposited on and over the rock platform. This hard-packed slag was clearly related in its horizontal extent to the causeway: that is, while it spilled down off the rocks around the edges of the platform, the layer generally ended within two to three feet of the platform. This association is clearly not fortuitous.

The identification of this hard-packed slag, and in fact all of the ferrous slag on-site, as refining slag (as discussed above) is one of

unexpected results of the excavation, and its implications will be expanded upon below. For this section, it is sufficient to say that the existence of this slag strongly suggests the very near presence of a refining forge of the finery and chafery type. It might be suggested that this slag is on-site as fill only and that it was brought from a forge some distance away to serve filling, levelling, and paving purposes. However, it was noted that in the field on a number of occasions that this hard-packed slag conformed to the outlines of the rocks beneath, suggesting that at least some of it was in a molten or near-molten form when brought on site.

As for why it was carted here, there are two possibilities. Either it was being brought to be used as surfacing and fill, that is, its presence was ancillary to the existence of the rock platform; or the rock platform existed to facilitate its disposal, i.e., the causeway was ancillary to the slag. Probably both these functional sequences are true, in that one can postulate that the causeway was in existence prior (perhaps for only a short time) to the generation of the refining slag, serving as a communication link between two separate but functionally integral parts of a complex; and that once the forge was in operation the causeway was being used to wheel carts or barrows of slag to disposal areas. Occasionally, loads must have been accidentally or deliberately tipped out on the rocks, but it is difficult to imagine it being a desirable surface for men, draft animals, or wheeled vehicles to traverse.

Vast quantities of the same type of slag exist to the south of the stone embankment, where it is clear it was not functioning as any kind of a surfacing. Probably this area represents a disposal area and access to it might have been gained not only along the causeway, but along the stone embankment as well (although the gray clay and wood chip layer was not traced along its surface west of the causeway).

As discussed above, the stratigraphy south of the race is not well understood. Moreover, the heavy slag and charcoal stratum there is not closely defined, since in N30E25, it was lying on the mottled clay

(assumed to be present at the time the race was open) and overlain by the clay with flecks of rust, which capped all the historic iron working levels at the site. Thus, stratigraphically it could have been deposited at any time during that period. However, it is postulated that it is most likely that its deposition corresponds to that of the hard-packed slag surface, and the mixed slag and charcoal layer (to be discussed shortly), because of the extremely high proportion of ferrous refining slag in the layer. It is possible that the same division between hard-packed and looser slag layers may be seen in this area in the existence of the flat circular plates, or "mossers" which occurred below the mixed slag and charcoal layer. The fact that F6 cut through both the hard-packed slag surface of the causeway and the compact slag to the south of the race, also suggests their contemporaneity.

Possibly contemporary with the causeway and its slag surface is the stone construction in N50E45, since its stones were lying on the race fill, and it was overlain by the mixed slag and charcoal level to be discussed below. Unfortunately, its purpose is entirely unclear. It appears to be a base of some sort but beyond that, not much can be said.

As described above, F4 is an enigmatic and ambiguous structure. There is no clear stratigraphic justification for placing it in this phase, but there is some circumstantial evidence. It cut into the reddish-brown silty clay, but this intrusion, of course, merely indicates that it post-dated that layer. One salient point is that the only area in the north of the site where a sequence other than that of the charcoal and slag directly overlying the reddish-brown silty clay was encountered was in N90W10 and N100W10, where an extremely thick layer of the ferrous slag was discovered cutting into the reddish-brown silty clay, below layers with pebbles and charcoal veining. This is within the area postulated to be enclosed by F4.

Another point already discussed is the likelihood that the charcoal layers encountered on either side of F4 are not the result of the

same process. In 1981 this was best observed in N60W5 and N70W10, N100E0 and N110E0. In those squares, the charcoal layer outside F4 (i.e., to the south or east of the F4 walls) has small lumps of slag but was otherwise relatively uniform. It was thin and it lensed out relatively quickly away from the walls. Within F4, the charcoal layer was thicker, covered the area more uniformly, but also had more inclusions and showed more banding with other layers, particularly brown gravel and lenses of red shale. It did not exist in N100W10 or N110W10 and became noticeably patchy to the north of N100E0. Most significantly, the artifact distribution differed markedly with almost no artifacts being recovered from the charcoal layers within F4, in contrast to the charcoal and slag layer outside the walls.

The obtuse angle formed by the two branches of F4 has already been remarked upon, as has the relatively late date for the destruction of the north/south branch compared to that of the east/west branch. One possible reason for these anomalies might be that the north/south branch of F4 was built after and lasted longer than the east/west branch, and/or that the two branches are not related and do not form walls in the same structure. This is extremely unlikely. While it was not possible to establish if the two walls butted together or were bonded together, they were clearly associated and had identical construction. Moreover, both walls demarcated an identical break in the stratigraphy, as already described. No reason for the obtuse angle has become evident.

The extension of F4 to the northeast (F9) might have a different period of construction, but nothing can be established about it stratigraphically or in terms of differential artifact recovery.

The final piece of evidence indicating that F4 should be included in this phase is very simply that, as pointed out above, the presence of the causeway suggests the need to link an activity area in the southeast or east with one in the northwest. The latter could be outside the site boundaries and long buried under U. S Route 15, or it could be F4.

What was F4? Given that it did not have a floor surface such as that identified for F1, and given the nature of the deposits within it, and given its substantial stone construction, it is not unreasonable to identify it as a charcoal house. Charcoal houses at other nineteenth century ironworking sites were huge, as much as 100 by 50 feet, as at Catharine Furnace, Virginia (Gruber 1978). Since they could not be made of wood because of the danger of fire, they characteristically were stone-built and of massive construction. Since they were used for storage, a compacted floor surface would not be expected; rather, a gradual accumulation of charcoal dust with some lumps of charcoal would be likely to build up. Conceivably, there might even have been a wooden floor inside and, thus, the layers above the reddish-brown silty clay represent material that sifted down through the cracks.

This identification finds support in the oral tradition of a charcoal house which stood at the foot of the Auburn driveway in the immediate vicinity of the Auburn Mansion stone pillars (William Renner:personal communication).

During this phase, therefore, the race was no longer in existence except as a low, probably wet, depression running across the south of the site. A causeway was put down to facilitate communication between the area to the southeast or east and that to the northwest, and at some point was also being used to enable ferrous refining slag to be dumped in the low-lying areas of the site. As workers tipped out the slag to each side of the causeway and to the south of the stone embankment, they fortuitously or purposefully were not only getting rid of a waste product, they were also filling in wet areas and surfacing the causeway.

There may have been a number of industrial loci to the southeast; one at least was probably the refining forge producing the slag. Needless to say, it could not have been powered by the now non-functioning raceway. It is suggested that F4 was already in existence at this time, although the stratigraphy is not conclusive on this point; and it may have been one of the reasons for the existence of the causeway.

Phase 2b (Figure 15)

The causeway may have continued in use for some time: it is postulated that the gray loamy clay with wood chips and patches of charcoal, which was a compacted layer, represents the stratum that was created by the movement and passage of men over the causeway. It was perhaps equivalent in formation to the gray clay with much wood that was found at the base of the hard-packed slag surface.

It is suggested that there still would have been problems with controlling the flow of water into this area, and that maintaining a relatively dry walkway might have required some expenditure of effort. This is an empirical observation since in both the 1979 and 1981 seasons, a constant seepage of water into the southern trenches was a perpetual concern (as is demonstrated in Plates 1 and 3 where the race is graphically defined--full of water). It is perhaps demonstrated in the archeological records as well: the layer of red water-washed gravel in N40E15 represents, it is suggested, the "delta" of the race which despite its silting still might have been channelling water onto the site. As water flowed from west to east it would encounter an obstacle in the form of the causeway and the rock pile, and the heavy particles would be dropped in the triangle between the causeway and the stone embankment to the south (the top of which was at about the same height). The force of the water may also have aligned pieces of wood along the edge of the rock platform (see Figure 7 and Plate 4).

F6 probably was constructed in an attempt to divert water away from the causeway. The east/west branch is more or less parallel to the southern edge of the rock platform, and the north/south branch may have been an additional barrier at a particularly troublesome spot. F6 is a relatively slight wall, narrow and loosely constructed. It seems unlikely to have served as a foundation for any kind of substantial construction, and the possibility of its being just a low wall to control water is quite good. Opposed to this interpretation of the red gravel and F6 is the fact that there was no build-up of gravel to the west of either branch of F6, as might have been expected.

Since F4 is presumed still to be in existence at this time, it might not be too speculative to suggest that the east/west branch of F6 might have intersected with the south wall of F4, somewhere off the site to the west, to create something of a yard into which the causeway would have provided access.

Other features which may belong stratigraphically to this phase include F43, a wall which, as already noted, bears a close resemblance to F6 in its construction. Because of its position, isolated from the other features of the site, its function is unclear. There was some suggestion of a lens of mortar on the south side of the wall which might have demarcated a surface, but too little of the wall or the lens was uncovered to allow further investigation. It is also possible that the stone base in N50E45 should belong to this phase rather than the previous one.

Phase 3a (Figure 16)

All the layers and features previously summarized, with the exception of F4, had in common that they were covered by the mixed slag and charcoal/charcoal and slag layer (B). The tendency in dealing with this stratum, which has already been touched on, was to regard it as a single layer created by a single process because of the similar inclusions of slag and charcoal, and because of its more or less uniform stratigraphic position. It is probably best to envision it as a combination of layers sharing similar charactertistics being created over time by activities of filling and levelling, and general use. It is believed that this layer was grade level at 18FR320 throughout the period following the creation of the causeway, the building of F4, and the construction of F6. In some peripheral areas of the site which did not see much activity, it was relatively loose with fewer slag inclusions, and had more of the nature of topsoil. In the central core of the site, in the area bounded by F6, the causeway and F4, it was more compact and included more slag.

In the southeast corner of the area excavation, F45 was laid down over the slag and charcoal layer. It is quite difficult to

interpret F45. The yellow clay with sand and flecks of mortar which defined it was identical to the surface defined as a floor within F1 (south); thus there is a tendency to regard F45 as a similar floor surface. The disposition of artifacts on F45 also gave it the apppearance of a surface. However, the surface was not as level or even as that within F1 and it is difficult to see how the stones randomly scattered on the clay with sand relate to the feature as a whole. Most importantly, no postholes, beam slots, foundation trenches, etc., such as might have served as evidence of walls or supporting members, were found. The plank of wood lying across N40E35 seemed superficially to define the southwestern edge of the clay with sand, but in fact, F45 overlay it.

So, at this period of the site, what is envisaged is that the slag and charcoal layer began to be created/deposited by a steady deposition of charcoal dust and nodules of slag onto the surface of the site. Possibly the causeway was no longer much in use if the success of F6 as a water control mechanism meant that the area to the east of the walls was now relatively dry, and movement over it could take place freely, without recourse to the causeway. Thus, churning and scattering of the deposited slag, together with artifacts within it and being dropped in it, was spreading it and them over the land surface. F6 itself was seemingly dismantled and the slag and charcoal layer used to level the area over it.

At some stage a spread of clay with sand and mortar (F45) was laid down over the charcoal and slag and over the hard-packed slag surface of the causeway, but for what purpose is not known. It may have been a working surface, or it may have been the remnants of an area where this material (sand with clay) was being piled or stored before being utilized elsewhere. F4, meanwhile, is assumed still to have been in existence.

Phase 3b (Figure 16)

Directly overlying F45 was a layer of red shale with inclusions of slag and charcoal. This layer is quite similar to the reddish-brown

silty clay. It almost certainly was excavated from the latter and from possibly the natural subsoil below it somewhere in the region and brought here to level this area of the site before the construction of F1. Because F45 is directly covered by the red shale without anything approximating the slag and charcoal layer between the two strata, it is suggested that F45 was in existence only a brief time before the red shale was deposited over it, and that F1 was built almost immediately after that.

The problem of the relative chronology of the two halves of F1 has already been discussed. Without ruling out the possibility of their having been built at separate times, it is suggested that there does not seem to be any meaningful chronological distinction between the two halves in stratigraphy or in mode of construction. Only the presence of the uniform surface of yellow clay with sand in F1 (south), and the lack of an east wall in F1 (north), distinguish between the two. The possible butt joint at the northwest corner not withstanding, it is believed that F1 (south) formed an integral unit and that if any part of F1 was an addition, it was the north half.

With the exception of the wall on the north, the walls of F1 were at a uniform height, and it is postulated that, unlike F4, they may have been foundation walls for a superstructure of some other material, probably wood (suggested by numerous finds of nails). Finds of large quantities of window glass around the south and to some extent the east and west sides of the south half strongly suggest the presence of windows in the south wall at least and, incidentally, lend credence to the hypothesis of one-period construction for the whole of F1, since what might be envisaged as a shed-like open-fronted storage area (north half) would be unlikely to have windows, and, of course, the wall between the two halves would also not need windows.

The stones along the south wall of the structure may be interpreted as the entrance to the south half of F1, where the sand with clay was tracked out over the wall. Alternatively, they may represent

the first stages of the decay of the structure, inasmuch as they and the spread of yellow sand with clay covered many of those pieces of window glass.

F41/34, the trench or trough cut down from the red shale layer to the hard-packed slag surface, must belong in this phase as well. As discussed above, its course corresponds to the south wall of F1 and, therefore, probably was associated with it, although its fill was covered by the stones and spread of sand with clay to the south of F1. Its fill also contained large amounts of window glass and nails. Thus, it might have immediately pre-dated F1, or might have been contemporary with it, filling up with debris which included broken glass and rubbish from F1 itself.

What its purpose was is unknown. It might have served as some sort of drain along the foundation of F1, but it is difficult to see how it would have functioned.

In this phase, therefore, both F1 and F4 were standing and the area around them must have served the purpose of a yard area. It does not seem that there was active deposition of large quantities of ferrous slag on the surface of the site anymore; rather, what seems to have been happening is that on the surface of the slag and charcoal layer (certainly to the south of F1 and possibly between F1 and F4) an occupation surface showing some compaction and some evidence of artifacts lying on it (mainly window glass) was developed. This is not a clear cut stratum, however, and in various parts of the site the charcoal and slag layer probably was undergoing no change.

Phase 4a (Figure 17)

It was in this period, at which point it is suggested that the buildings were not being used and were beginning to fall into disrepair, that various layers of reddish-brown gravel and brown sand (D and E layers) appeared on site. The problems surrounding these layers and

their relationshp have already been discussed in the description of the excavations. Suffice it to say that partially overlying the walls of F1, the east/west wall of F4, the charcoal and slag/mixed slag and charcoal layers and (in the southeast) the red shale fill, were these layers which all included more or less sand and gravel within various matrices.

The reddish-brown gravel included more artifacts and looked like sheet wash, while the brown sand was quite clean and may represent a water-deposited wash of gravels and sands spreading across the site after partial abandonment. The intrusive nature of the brown sand, which seems to have cut into earlier layers, may be explained by excavation in this area before water was allowed to flow over it, or possibly by scouring action. The brown sand may relate to the feature thought to be a raceway located by Kenneth Orr in 1979 in machine trench 6 (Feature 1), to the northwest of the site (Orr and Orr 1980:93 and Figure 39).

What follows is quite speculative although it fits well within the site chronology and with various other points. It is suggested that at this time the north part of the site was undergoing a radical transformation in connection with the construction of the Auburn Dam. This conceivably involved such activites as dismantling the walls of F4 and using those stones in the construction of the stone facing for the embankment, and also diverting the flow of water (which would eventually be used to fill the impoundment) around the construction area proper. It should be remembered that the dam was constructed on the layer interpreted as the northernmost equivalent of the charcoal and slag layer.

It is suggested that it is not inconceivable that while the east/west wall of F4 was robbed out, the north/south wall was allowed to remain standing to act as a sort of coffer dam, keeping the flow of water to the southwest and away from the dam construction. The brown sand might then be the actual particulate matter carried in the water, while the reddish-brown gravel might be material washing down from

the construction of the earthen berm. Possibly some portions of the walls of F1 were still standing, albeit in derelict condition, and might have acted as a break to the flow of water, since the end of the brown sand layer in the T-3 profile (1980 Figure 6) is approximately at the point where the F1 north wall would have existed.

At around this time or shortly after, the stone trough (F8) was constructed. It seems clearly to have functioned as some sort of a drain, dropping from east to west, but it is difficult to decide if it relates to this period of dam construction or to the next phase which involves the Auburn driveway features. The break in the 1979 T-7 profile (1980 Figure 16) between the brown sand and the layers to the east comes at the point where the F8 stones appear in the profile, which might suggest that it had some connection with the drainage modifications. The trench is quite small, however, and was obviously not designed to handle large quantities of water. It is included in this phase because it was covered by the clay with flecks of rust, but its alignment perpendicular to the admittedly later driveway (F5) suggests that it somehow related to that. Though there were no signs of any cover for it, it is not impossible that it might have had one at one time, in which case it would have been designed to carry water under the driveway.

Phase 4b

The layer of clay with flecks of rust was brought in as a fill layer and uniformly deposited over the site at this time, covering all layers and features previously discussed. This marks the close of any connection of site 18FR320 with any kind of ironworking activities.

Phase 5a (Figure 18)

It is suggested that the clay with flecks of rust was brought in to level the site immediately prior to construction of the driveway to Auburn Mansion. Early on the drive probably consisted of no more than lenses of various fills thrown down as needed and compacted through use (the G layers). The anomalous pit (F37) filled with

stones may relate to this phase, though it is not known with what purpose.

In time, however, an imposing entrance was created, which included a quartz pebble driveway, landscaping represented by probable planting pits (F30, F33, F36) and a stone edging wall (F7/38). It is not impossible that the north/south wall of F4, still standing in this period, could have been utilized as a matching wall. It may even have dictated the course of the driveway in this area. F31 probably was a drainage ditch beside the driveway, possibly leading to F8. Three small unnumbered postholes indicate the location of a fence defining the property line of Auburn. The large postholes (F48) obviously marked the location of gates, possibly related to the stone pillars. All these features (except the pillars) are stratigraphically between the deposition of the clay with flecks of rust (F) and the brown loamy clay, although it cannot be determined with certainty if they are all contemporary. The pillars, for example, are likely to be late.

Phase 5b (Figure 18)

Over the driveway features and the whole site, various fill layers relate to the modifications of the roads in this area. Over the loamy brown clay, lenses of macadam topped with asphalt or blacktop may represent a later driveway extended down to an earlier alignment of Maryland 806, the base level of which might be represented by the layer of cobbles at the same level. Alternatively, the macadam itself may be Maryland 806. The other significant fill layer was the heavy slag fill encountered in 1977 and 1979, the top of which was at the same level as the macadam and cobbles. So it undoubtedly also represented fill prior to the construction of the earlier Maryland 806, as described in the 1930's by W. H. Enslow (Orr and Orr 1977:78, and see Chapter II this report).

B. Artifact Discussion

The discussion of the artifacts in Chapter V was prefaced by Chapter II, in which the technology the artifacts are a product of was outlined. For an industrial site in which the primary research goal is to explicate the technological processes which are taking place, the analysis of the artifacts must be oriented towards understanding and explaining how they were made. On a stratified site like 18FR320, the possibility of identifying technological changes in the activities taking place through time gives an added perspective to the analysis. In this section, an attempt is made to identify and describe the industrial practices taking place during the time the various stratigraphic layers were laid down at 18FR320.

As an aid to analysis and interpretation, the spatial and stratigraphic distribution of certain kinds of artifacts is shown in Figure 19 and Table 3. These are artifacts which are considered significant in the interpretation of the techniques and technology of casting and finishing the products of a furnace and consist of wedge gates, sprues, stove plates, hollow ware, chisels, files, and other tools. The spatial distribution of these artifacts (Figure 19) shows a fairly random distribution across the site with the exception of the area defined by F1 where there is a noticeable absence of artifacts. Apart from F1 there seems to be no obvious difference in the distribution of artifacts inside or outside buildings and no areas with unusually high concentrations of specific types of artifacts. The only other relatively blank areas are those excavated by machine where the absence of artifacts is a reflection of the difference in recovery techniques between a hand excavated and a machine excavated area. The plotting of the artifacts on Figure 19 does not take any stratigraphic factors into account, and is a representation of the total assemblage found in each square.

The stratigraphic distribution of artifacts is shown in Table 3 where the preponderance of objects related to ironworking in the

Table 3. Distribution of Diagnostic Artifacts

Context	"Wedge" Gates	Sprues	Stove Plates	Hollowware	Chisels	Files	Other Tools
Race Fill (F44)	3	--	--	1	2	1	--
Reddish-brown silty clay (A)	20	3	4	10	1	--	2
Slag and charcoal layers (B)	21	7	21	15	4	5	7
Yellow sand with clay(F45)	--	--	--	3	--	--	2
Red shale fill	4	2	--	1	--	--	2
F41	--	2	--	1	--	2	1
F1	1	--	1	--	1	--	1
Reddish-brown gravel (D)	6	3	1	4	4	--	3
Clay with flecks of rust (F)	1	1	--	--	1	--	--
Driveway layers (G)	--	--	--	1	--	--	1

reddish-brown silty clay and the slag and charcoal layers is obvious. Both these layers are interpreted as periods when fill was being deposited on the site and no clustering of significant artifacts was noted during the initial tabulation of this material. The small sample size in the other layers and the lack of significant clustering in the silty clay and slag and charcoal layers indicates that little information of value in defining activity areas would ensue from plotting the spatial and stratigraphic distribution of artifacts from 18FR320. The most valuable information to come from the stratigraphic table is the definition of the temporal horizons in which ironworking debris is deposited on the site. As indicated above, these are the silty clay layer and the slag and charcoal layers. A small amount of material relating to ironworking came from the other layers which can probably be defined as residual material from the earlier fill layers. Both the red shale and reddish-brown gravel have somewhat higher amounts of ironworking debris, perhaps indicating larger scale disturbance of the earlier layers.

As discussed above, the way in which the stratigraphic layers were deposited on the site is very relevant to the interpretation of the activities taking place there. Artifacts brought in with fill layers are representative of the processes which resulted in their deposition in their primary context, not to the site where they are redeposited as fill. At 18FR320 the majority of the artifact-bearing strata appear to be fill layers, and as such are not directly informative about the activities taking place on the site. The nature of the activities which created the artifacts, however, gives an analysis of their great value in understanding the industrial processes taking place off site. In the remainder of this section of the report, an attempt will be made to define and date the activities represented by the artifacts within the temporal framework of the site stratigraphy. The interpretation of the significance of these definitions will be assessed in relation to 18FR320 and to the ironworking complex at Catoctin as a whole.

In the description of the stratigraphical contexts of the artifacts which follows, it should be noted that given the identification of all the ferrous slag as refining slag, it is assumed that the various layers which contained significant proportions of slag, or were within those layers, represent one temporal horizon and have been grouped together as "charcoal and slag layers." This would include, therefore, the hard-packed slag, the mixed slag and charcoal (in the south of the site), and the charcoal and slag (in the north of the site).

In the earliest recognizable period of activity, that of F44, very few artifacts were found. Objects associated with ironworking consisted of three wedge gates, two chisels, a hollow ware fragment, and a file. This material is indicative of iron casting and the trimming of castings at the time this layer was deposited. These artifacts, however, actually relate to a period when F44 was silting up and not to its period of use as a race or water channel. Other artifacts found in the race fill are also associated with the period when the race was silting up including ceramic sherds of redware and whiteware, one of which had a blue transfer print design. A green glass bottle base with a pontil mark was also recovered, as were four leather fragments which included a portion of a strap. A large wrought iron object measuring 15 inches by four inches by two and a half inches and found in the raceway was identified as a skein from a tar skein axle. Other items of interest included a copper alloy gun powder flask found on the bottom of the race, a large spiked implement 18-1/2 inches long, and a cast iron object with a groove in it which may have been a bearing block. Noticeably missing from this context was ferrous slag, although some glassy slag was found.

Although the function of this large spike is uncertain, and it was suggested above that it might be a tool or building hardware of some kind, its location in the race indicates another possible interpretation. The various sluices and water control mechanisms in a raceway were operated by levers (cf. Zimiles and Zimiles 1973:12) and the spike may have been used for this purpose. The iron bearing block

which came from the same context may also be assigned a function as part of a water control apparatus. The finds of wood in the race, as already discussed above, affirm the likelihood that parts of the mechanisms which controlled the water would be likely to be found in the fill.

Additional artifacts were found in the reddish-brown silty clay layer. These included a small, flat, broken casting, possibly a door plate, and fragments of casting waste. Among the casting waste were 20 wedge gates and three sprues. Four fragments of stove plate and ten fragments of hollow ware were also identified. Wrought iron tools including one chisel, a molder's stick, and a hook were found in addition to a fragment of a "Berry's Premium Firebrick." Ferrous slag and a small amount of glass slag, one fragment of which had the impression of a piece of wood in it, were also recorded.

The assemblage from this layer suggests an increased amount of iron casting activity with the presence of the molder's slick perhaps indicating flask molding. The ferrous slag is indicative of iron refining in the vicinity of the site and the brick, which is presumably from a furnace lining, also indicates some kind of ironworking activity. The number of artifacts recovered is relatively small, but the general conclusions about the activities represented by the material in this layer seems valid.

As discussed above, the slag and charcoal layers, because of their homogeneity, are grouped together. These layers contain the greatest numbers of items associated with ironworking, including 21 wedge gates, seven sprues, 21 fragments of stove plates, 15 hollow ware fragments, four chisels, and five files. Among the stove parts were fragments of feet and door plates with rivetted latches and a hinge fragment. Stove bolts with butterfly nuts were also found, as was a flat plate fragment with a "3" on it. Hollow ware comprised fragments of pots with feet, portions with cast handles, and fragments with cast ears for handle attachements. Tools, other than the chisels and files,

included a wrought iron draw knife with the maker's name "AMES" stamped on it (Plate 10), screwdrivers, and punches.

Of relevance to the casting process was a portion of a cast iron flask and a complete cast iron flask clamp (Plate 14). Other items associated with casting included a flask hook, a possible gagger for supporting a casting core, and fragments of runners, including one which had been used in casting a multiple number of artifacts (Plate 15). Among the items being produced other than stoves and hollow ware was a gear wheel (Plate 12), and a wagon box (Plate 13), both of which had runner scars on them and had not been trimmed of excess metal. Other miscellaneous iron objects included portions of probable cast iron cooking pot stands with rivetted wrought iron feet.

Other items include three horseshoe fragments, an iron pig fragment, "shot" (waste iron spilled during casting), a large number of cut nails and an equally large number too corroded to identify the manufacturing technique, chain link fragments, hinges, spikes, a hook, and various unidentifiable fragments of cast or wrought iron. Non-metal artifacts included window glass, one sherd of salt-glazed stoneware, one sherd of whiteware, and three fragments of "Berry's" firebrick, including one which was marked "fireproof."

The majority of the artifacts, however, were items associated with casting. Both flask casting and open mold casting are indicated; the wedge gates, sprues, flask clamp, gagger, and the flask remains themselves are evidence of flask casting. The runners and the castings which showed evidence of runners indicate open mold casting. The products being produced included stoves, hollow ware, pot stands, wagon parts, and machinery parts. The various tools found suggest that stoves were "fettled" and then assembled using the stove bolts. The draw knife is somewhat anomalous and presumably relates to some kind of woodworking activity being carried on concurrently with the iron-working. The nails and other hardware may be from wooden flasks and conceivably the draw knife may have been used in making flasks. The

window glass, however, indicates some evidence of structures and some of the nails could be from these structures. The firebricks, too, are from structures, but these structures, as suggested above, are presumably associated with some ironworking function.

Most of the artifacts from the yellow sand with clay surface of F45 were cut nails. Three fragments of hollow ware were found, in addition to five fragments of casting waste, a large threaded nut, a chain link, a punch, a wrench, and a fragment of a "Berry's" firebrick. The paucity of this assemblage makes any interpretation of the functional activities taking place in this area difficult. The wrench would have been suitable for assembling stoves, but could also have been used for a number of other purposes. No valid conclusions as to the function of F45 appear justified on the basis of the artifactual evidence.

The red shale layer contained a small quantity of significant artifacts including four wedge gates, two sprues, a hollow ware fragment, a screwdriver, and a side set hammer. Nails, spikes, sheet metal fragments, and a chain link were also found. One enigmatic object was a large staple-shaped piece of wrought iron for which no identification has been possible. Again, this is a small assemblage and interpretations of the activities represented are tenuous. The hammer is of a type used by a blacksmith and the wrought iron staple-like object had obviously been worked by a blacksmith. What evidence there is points to the activities of a smith, as well as the evidence for iron casting embodied by the gate metal.

Few artifacts were recovered from F41 other than nails and window glass: a sprue and a stove plate fragment, two chisels, and a punch represent the evidence for ironworking. A chain link was also found. Evidence from F1, the structure beside which F41 ran, was more substantial, comprising one wedge gate, one stove plate fragment, a chisel, and a punch. This layer also contained a fragment from a cast iron pot stand with a rivetted wrought iron leg (Plate 11), and a heavy cast iron bush. Wrought iron objects consisted of a skein from a tar skein axle

measuring 19-1/2 inches by five inches by two inches, a horseshoe, a chain link, 40 nails, and a spike. One small fragment of bottle glass was found, as were approximately 40 small sherds of window glass. Ceramics comprised 18 tiny fragments of redware.

Little more can be said about the few artifacts from F41. The material from F1 indicates a variety of ironworking activities may have been taking place when the assemblage was laid down, but the similarities between these artifacts and those from earlier layers may indicate that they are residual objects dating from an earlier period of activity which became incorporated in the F1 layer during its demolition.

Artifacts from the reddish-brown gravel layer included six wedge gates, three sprues, one stove latch fragment, and four hollow ware fragments. Tools from the layer consisted of four chisels and three punches. Casting waste in the form of a runner and a gutter was found, as well as "shot." Two wrought iron hooks and a horseshoe fragment were found; ceramics were represented by one sherd of gray, cobalt-blue decorated stoneware. This assemblage is consistent with casting activity, but the nature of the matrix in which it was found is suggestive of sheet wash, and it may be that some of this material is derived from earlier deposits.

Material from the clay with flecks of rust included few of the ironworking artifacts common to the rest of the layers. One wedge gate, one sprue, and a chisel were the only objects associated with ironworking. The remainder of the artifacts included nails, spikes, two horseshoes, and an iron ring. One sherd of Chinese export porcelain and some sherds of plate glass were also found. Two coins came from this deposit; an 1842 dime was found at the interface between the clay with flecks of rust and the slag and charcoal layers, and an 1875 dime came from within the clay with flecks of rust layer.

This layer is interpreted as a fill layer and the majority of the layer appears to be derived from an area where there was little

evidence of ironworking. This is indicated by the sparseness of the material associated with iron in contrast to the rest of the site.

The driveway layers represent the greatest contrast with the earlier layers on the site in their artifact content. Ceramics, which included Chinese export porcelain, annular pearlware, engine-turned whiteware, and ironstone, comprised 61 percent of the assemblage. Glass consisted of 45 fragments or 16 percent of which 42 were window glass and three bottle glass. Bone, which was noticeably absent from the earlier layers, represented four percent of the material found, and the remainder was made up of metal artifacts. One fragment of hollow ware and a molder's slick were the only metal objects indicative of ironworking. The remainder of the metal consisted of items such as nails, strap iron, a hinge, and an iron ring. Two coins came from the driveway layers, an 1877 penny and an 1890 nickel.

This assemblage of material is consistent with a trash deposit, and its only connection with the ironworking component of the site is the residual material in the deposit. Presumably, most of this material was either discarded by people using the driveway or was incorporated as fill into the driveway layers.

C. Dating

The dating of the stratigraphic layers at Catoctin is important for the interpretation and integration of the excavated evidence with the documentary sources. For virtually all the earlier layers on the site, however, secure dating evidence is not available. Four coins were found during the two seasons of excavation; an 1842 dime, an 1875 dime, an 1877 penny, and an 1890 nickel. These are perhaps the most reliable evidence for dating the layers excavated at Catoctin.

Another dating aid which is also useful is the draw knife with the maker's name "AMES" on it. This company commenced business in Massachusetts around 1834 (Herskovitz 1978:64), so the draw knife has to be later than that date. Other artifacts of some use for dating are described in more detail below, and comprise a number of brick fragments with the maker's name on them and a copper alloy gun powder flask.

A number of firebricks usually in a fragmentary condition were found during the excavation. Some of them had portions of an impressed brand name on them, and from the more complete examples it was possible to determine that the bricks were "BERRYS PREMIUM FIREBRICK." One variation was noted in which the brick was described as "FIRE-PROOF." On any industrial site where extreme temperatures are required, firebricks will be utilized because of their superior refractory qualities.

It seems likely that these bricks were manufactured in Baltimore. There is evidence that the furnace was trading in Baltimore and also that "back loads from their trading expeditions included bricks" (National Heritage 1975:12-14). Firebrick makers named Berry are listed in Baltimore from early in the nineteenth century. A Thomas L. Berry, brickmaker, is listed in 1819 (Baltimore Directory 1819), and a J. and T. L. Berry, patent firebrick manufacturers, in 1829 (Matchett's Baltimore Directory 1829). The same people are

listed in 1849 as fireproof brickmakers (Matchett's Baltimore Directory 1849).

John S. and George R. Berry, firebrickmakers, are listed in the 1860 directory, and every subsequent year through 1891, when they appear to have gone out of business (Wood's Baltimore City Directory 1860; Polk and Co. Baltimore City Directory 1891). The date range of these bricks would appear to be from 1829 until 1891, although it is, of course, possible that some unknown Berry was brickmaking before the first directory reference, and the bricks could have been in use well after 1891. The bricks appear to have been made in a brick molding machine, a device which was first patented in 1793; similar machines were in general use by the first decades of the nineteenth century (McKee 1976:84-84). The brick brand marks on the bricks from Catoctin were, of course, used to advertise the makers; brands on bricks became common after 1870, but were in use by 1830 (Kelly and Kelly 1977:86-87). As a dating guide, the bricks are not very useful, although it could perhaps be assumed that they date from the 1830's onwards. The same brand of brick was found during the earlier excavations carried out at Catoctin at the main furnace (Orr and Orr 1975:18).

One other object of interest was a copper alloy powder flask (Figure 20). This object is decorated with an embossed shell and bush design and has a pivoted gate closure. This type of flask was made in Birmingham, England during the nineteenth century and appears to be a fairly common type (cf. Riling 1953:286, 289 No. 33; 291 No. 364). Metal powder flasks appear to have come into use in the early nineteenth century (Riling 1953:14), and continued to be used throughout the century, although their number declined with the introduction of percussion cap cartridges and other forms of cartridge from the 1860's. In use the flask allowed a measured amount of powder to be introduced into the weapon by operating the gate mechanism.

Dating evidence from the raceway (F44) relates to the period when the feature had gone out of use and was silting up. The copper alloy

powder flask found at the bottom of the race would probably not have been made before 1800, as it is representative of a type of artifact that started to be mass produced during the early nineteenth century (Riling 1953:13). The one sherd of blue transfer-printed ceramic is the only other dating guide, and this, too, is consistent with a nineteenth century date. While the dating evidence is far from conclusive, a date in the first quarter of the nineteenth century for the period when the race was silting up may be appropriate.

Other than the firebrick which suggests a post-1830 date, there is little dating evidence which could be applied with confidence to the reddish-brown silty clay layer. For the slag and charcoal layers, the presence of the draw knife, which must have been made after 1834, indicates that the specific layer in which it was found must have been laid down after that date. Some of the other layers within this group stratigraphically below the one in which the draw knife was found may, of course, be earlier. The 1842 dime which came from the interface between the slag and charcoal layers and the clay with flecks of rust is assigned to the stratigraphically higher level, but it is not inconceivable that it might have originated in the lower slag and charcoal layer. This would be more in keeping with the 1875 date of the other coin from the clay with flecks of rust, a date which suggests that the 1842 coin is somewhat anomalous in the layer to which it is assigned. The dating evidence from the slag and charcoal layers is far from conclusive, but it appears that the layers were deposited sometime between 1830 and 1850. This would be consistent with the evidence of the three Berry's firebricks, which are unlikely to be any earlier than 1830.

The yellow sand with clay inside F45 cannot be dated with any confidence on the basis of the available evidence. A firebrick fragment from the layer suggests a post-1830 date, but other than that, no other datable material was found. The red shale layer, F41, F1, and the reddish-brown gravel layer are all undatable on the basis of the artifactual evidence, but some dating help is provided by the layer

stratigraphically higher, the clay with flecks of rust. The 1875 dime from this layer indicates that it could not have been laid down earlier than this date. It has already been suggested that the slag and charcoal layer had accumulated between 1830 and 1850: the four layers were stratigraphically higher than the slag and charcoal layers, but have to date before c.1885 when the clay with flecks of rust may have been deposited. The dating for the clay with flecks of rust is, of course, based on the coin evidence, and on the assumption that the coin may have been in circulation for ten years before it was lost.

The final layers to be discussed are those associated with the driveway. The presence of fairly large quantities of ceramics and two coins dated 1877 and 1890 allow a more precise end-date to be allocated to these strata, and it is suggested that these layers were laid down before c.1900. The ceramics included a range of material in use from the mid-nineteenth century onwards, so the date range for the deposition of the driveway layers is postulated as c.1850 to 1900.

VII. SUMMARY AND CONCLUSIONS

A. Site 18FR320 Summary

Ignoring for the moment the features associated with the Auburn driveway and the later road fills (i.e., Phase 5), site 18FR320 can be summed up as including or being bordered by the following significant features:

- an early raceway (F44) passing through the south part of the site, providing power to an installation to the east at a time when nothing else is on site;

- layers (reddish-brown silty clay and slag and charcoal layers) which include significant amounts of refining slag and charcoal, together with casting debris, fragments of cast iron artifacts, implements to finish the artifacts, and possible blacksmithing tools, all laid down at a time after the silting of the race;

- two structures, one of which (F1) certainly post-dates the layers above, the other of which (F4) is something of a "floater" stratigraphically, inasmuch as it may or may not pre-date the charcoal and slag layers;

- a stone and earth dam at the north also "floats" stratigraphically in relation to the rest of the site, but which must post-date at least one phase or lens of the slag and charcoal layers, and if the observations made in the last chapter hold, may post-date the abandonment of the structures.

What should immediately stand out is that, regardless of metallurgical and archeological evidence for both the refining of iron and the casting of iron artifacts (which is evidence either of smelting and founding or remelting and founding), nothing which can be interpreted as a forge or furnace structure was discovered in the excavation. As discussed in Chapter III, a blast furnace, remelting (either cupola

or reverberatory) furnace, or forge would all have had fairly substantial foundations, and would have left other distinctive traces. No ore or flux were found at 18FR320, no substantial heaps of smelting slag, no burned or unburned molding sand, and probably no hammerscale. No evidence of a hammer emplacement was located within the structures, nor was anything like an anvil base, nor anything like the thick bed of sand (at least two feet thick) expected in a casting house or foundry (Overman 1872:50). The only finds that are evidence of some kind of furnace or forge fire were the fragments of "Berry's Premium Firebrick."

In sum, it is clear that the primary activities of casting and refining were not taking place within the confines of the excavation. The activity that 18FR320 was being utilized for, at least in the early stages of the period defined by the reddish-brown silty clay, and charcoal and slag layers, was disposal of unwanted debris, specifically slag from the refining forge.

Charcoal is virtually the only material which is postulated to stem from a source on site. The construction of F4, the oral tradition, and the layers within and around it all are in keeping with an identification of it as a charcoal house. The feature identified as a causeway, therefore, might have connected the charcoal house with the refinery forge which according to this interpretation would have been to the southeast or east of the site.

No interpretation of F1 has been offered to this point. As discussed in the previous chapter, the artifacts found within what is interpreted as the floor level do not conclusively suggest a particular function. Casting debris, fragments of finished cast iron artifacts, finishing tools, and the possible pot stand indicating a stage of finishing beyond "fettling" might, if considered in isolation, suggest the use of F1 for the cleaning, finishing, and assembling of objects such as pots, kettles, and stoves. In support of this hypothesis might be the general absence of the diagnostic artifacts from the area within F1 suggesting the interior of the structure was kept clean.

This difference is more likely to be a consequence of excavation strategy than a deposition pattern which respected F1, however, since most of the artifacts occurred in layers which stratigraphically pre-dated the walls, and the floor stratum was not fully excavated inside F1. Also, the artifacts in the floor layer were similar to those in the earlier layers, and so it is assumed that it is simply residual material from earlier layers. Thus, while it seems likely indeed that some sort of finishing and assembling house existed near 18FR320 (given the numerous finds of files, chisels, and parts of rivetted and assembled objects), it is not believed that F1 was this structure.

It does not seem possible, in fact, to define a function for F1. When site 18FR320 is discussed in relation to the historical documentation and to the rest of the Catoctin complex, a few possibilities for its use will be put forward, but it must be stated now that the archeological evidence only revealed these points: that F1 was a two-roomed structure, or a one-roomed structure with an open-fronted addition; that it probably had a wooden superstructure on the stone foundation; that it had windows in the south side; that it possibly had an entrance in the southeast corner; and that it had a sand with clay floor.

Leaving aside for the moment the two constructions for water power, the dam and the race, which both apparently were intended to drive installations off the site, the area within 18FR320 seems quite clearly to be the locus of activities ancillary to primary ironworking activities of refining and casting. Only one structure on the site (F4) need be directly associated with those activities; otherwise, the site was a dumping ground for the waste products generated by those activities.

B. Site 18FR320 in Context

It should be remembered at the outset of this section that there were very few artifacts within the layers of interest that could be dated at all, let alone closely dated. So while the relative sequencing of layers and features within the site is quite solid (with the important exceptions already noted, namely F4 and the dam), tying that sequence into the historical chronology is risky. Accordingly, much of the following is somewhat speculative, and an attempt will be made to consider all the possibilities consistent with the archeological data, rather than advancing a single interpretation.

The race is the earliest feature on the site and the silting of the race is the longest archeologically defined hiatus on the site. There was no refining slag within the race fill, but there were small nodules of furnace glass (smelting slag) from a charcoal blast furnace. The race is likely to have been a head race, and it is dropping from west to east. The best date for the fill layers, based on the find of a gunpowder flask within them, is between 1800 and 1825.

It is postulated that this race was supplying water power for the first furnace at Catoctin, that which was in operation by 1776, and presumably out of blast sometime after 1787, the date when another furnace (Stack No. 1) was erected "about three fourths of a mile further up Little Hunting Creek and nearer the ore banks" (reference should be made to Chapter II for all historic citations not identified). By this interpretation, the furnace would have been substantially to the east of site 18FR320, since none of the indications of a blast furnace were present within the site. This would put it, perhaps, near the confluence of Little Hunting Creek with the stream which the race was probably fed by, or possibly in the region which was suggested by W. H. Enslow in the 1930's (Orr and Orr 1977:78). The presence of the Auburn ore bank, directly to the west of site 18FR320, is worth noting as support for this placement of the first furnace (Figure 1).

The rather long period of time which it must have taken for the race to silt up would then be equated with the period from 1787 to 1831. It should be remembered that the Auburn tract, within which site 18FR320 was probably subsumed, was resurveyed as an entity in 1802, and passed out of ownership of the furnace owners in 1811, when that tract was left by Baker Johnson to his son, as opposed to the furnace and furnace lands which he left to his daughters. It has been suggested above that when John Brien and John McPherson purchased additional land, which included part of Auburn, to add to their holdings at Catoctin, that site 18FR320 may have been in that tract, and that it thus passed back into furnace ownership at that date. It might be recollected that on the 1808 Varle map no forge was located, and no forge was mentioned in the 1811 or 1820 sales notices, or in the 1825 Frederick County Assessment records (Thompson 1976:81).

Several sources suggest "rebuilding" of or "very expensive improvements" to the furnace and complex by Brien and McPherson (Lesley 1859:50; Alexander 1840:79). It is postulated that around 1831 a refinery forge constructed to the east of 18FR320 might have been one of these improvements, and that a foundry furnace in the same region may have been another.

This tie-in depends upon the dating of the layers with ironworking debris (reddish-brown silty clay and charcoal and slag layers) to the period between 1830 and 1850. As will be remembered, both those layers contained "Berry's Premium Firebricks," and at or on the surface of the latter was the "Ames" drawknife and possibly the 1842 dime. Thus, they must date after the 1830's, and the surface might have been open up to 1842 at least.

One difficulty with this interpretation is why a forge would have been built at Catoctin. Certainly, it is unlikely that it could ever have been producing commercially, and it must have been quite short-lived, as there is no mention of it in either the 1841 or 1856 sales notices. On the 1858 Bond map it is described as an "Old Forge." It can only be suggested that it was built to fill the

intramural needs of the Catoctin Furnace complex for wrought iron and/or to experimentally test the quality of the wrought iron produced. While Brien and McPherson had owned the much larger Antietam Iron Works since 1806, which had two forges (from around 1815) producing bar iron, it is possible most of that output was going directly to the rolling and slitting mill at Antietam to be made into nail rod and other wrought products (Thompson 1976:79f). The expense of transportation of bar iron from Antietam to Catoctin may also have been a factor.

An admittedly weak point about this argument is that it assumes ignorance on the part of these two extremely knowledgeable iron manufacturers about the poor quality of the iron that would be produced. However, iron technology cannot really be considered a science in the nineteenth century. It was much more of a skill or an art, in which success or failure of a technological innovation was something to be empirically tested, rather than confidently predicted. The general surveys abound with examples of installations, particular furnaces being erected, in blast for a year or two, then abandoned, "the one proving unproductive, and the Iron indifferent" (Alexander 1840:78).

This point needs to be pursued further. It has been analytically established that the cast iron was high in phosphorus and that it would have made fine, sharp castings (thus, the claim in the 1820 sales notice that the area of the mine bank "is considered equal to any in the country for castings" has been validated). It has been assumed that wrought iron produced from this iron would be cold-short from the phosphorus and of poor quality, based on mid-nineteenth century and present knowledge of the metallurgical processes which take place in refining. However, this can be no more than an assumption until and unless checked by analyzing a piece of wrought iron that was a certain product of the forge. It may be that it was not so much that the iron was of poor quality as that it was expensive to refine. In the time it would take to remove the phosphorus (see Morton 1973:94, Fig. 2), appreciable oxidation of the iron would have

occurred, with subsequent loss of that iron to the slag. It may be suggested that this might be the reason for the excessively high levels of iron in the slag.

The other possibility is that pig iron smelted from better ores was brought into the vicinity for refining in the forge. Only testing of the wrought iron could decide this. However, the find of the fragment of white pig iron with relatively high phosphorus suggests otherwise. It is very significant that, unlike virtually all the other irons tested, only the fragment of pig iron was white, with very low levels of silicon. De-siliconizing pig iron in the refinery was of crucial importance. With the advent of coke-smelted pig with its very much higher levels of silicon, because of the higher temperatures, an intermediate stage between smelting and refining in a charcoal forge had to be instituted, namely the de-siliconizing in a run-out furnace (refinery) (Morton 1973:99; Overman 1854:256). This problem helped bring about the adoption of puddling. The fact that the pig had relatively high levels of phosphorus (though lower than all of the other examples except the sprue or riser) and low silicon might suggest deliberate manipulation of the ore and fuel charged to produce an iron well-adapted to refining. However, it must again be stressed that analysis of a single sample can only be suggestive, not conclusive, evidence.

It was noted above that a foundry furnace may also have been an improvement of this time. It is necessary to contemplate this possibility, although it is believed that the casting waste seen at 18FR320 was originally generated by casting from a furnace, specifically Stack No. 1. The reasons for and against this argument can be summarized as follows.

There was no certain remelting furnace slag identified, and none of the molding sand that would be expected if casting and "shake-out" of pieces were taking place near the site. There is no evidence for a foundry at Catoctin until the Census of 1860, while there is certain evidence that casting directly from the blast

furnace to make "country castings" was common practice at Catoctin as at virtually all charcoal blast furnaces in the first half of the nineteenth century. Cupola furances were not common until the 1850's; the George's Creek Coal and Iron Company erected one at Lonaconing in 1839, but that was one of the most advanced furnaces in the United States at that time (Harvey 1977:54). The possible presence of a reverbatory or air furnace is an open question. What form of slag they would have produced is not known. Bining, however, notes that "air furnaces, the progenitors of modern cupolas, were usually built in towns or boroughs" (1979:37).

The only truly persuasive reason to imagine a foundry in operation near site 18FR320 is the quantity of gate metal, and the few implements and objects directly related to molding, which included possible molder's slicks, flask parts, and flask clamps. If the casting had been taking place up at Stack No. 1, there are only two ways the gate metal could have been brought down to the vicinity of 18FR320: attached to the castings, or brought down deliberately to be used as scrap metal. Postulating the former hypothesis forces one to assume that the founder at Catoctin so departed from traditional practice as to have castings carted about with the sprues on, instead of knocking them off immediately after shake-out; this is not thought to be very likely. The latter hypothesis only works with the assumption that the gate metal was being charged to the forge. As discussed above, this would seem to be unusual practice. It might be noted, however, that Walker writes, "Throughout its history Hopewell [Furnace, Pennsylvania] also sold pig iron and gate metal to forges where it was further treated" (emphasis added). Gate metal, he writes, "was not as convenient to handle; so it usually sold for about $2 per ton less than the price of pigs" (Walker 1967: 151).

To sum up, then, the bulk of the evidence, both archeological and historical, suggests that a refinery forge was erected by Brien and McPherson starting sometime after 1831 and probably not continuing after 1839 at the latest (when the furnace apparently went out of blast

until sometime after Fitzhugh purchased it). It is suggested as well that gate metal may possibly have been charged to the forge, and that a fettling and assembling shop was located near the forge, where the castings were trimmed of excess metal, scoured or cleaned, and (in the case of the stoves) assembled. It is quite possible that a smithy was in the area as well, based on the finds of blacksmithing tools found in conjunction with slag and casting debris. F4 is suggested as the charcoal house supplying the forge. F1 might have been the fettling shop, but is more likely to be a somewhat later ancillary structure.

Fitzhugh purchased the furnace in 1843, at which time it included Auburn Farm and, it is postulated, site 18FR320. In 1848, the "warehouse plot and other land was purchased by the Auburn owners. The eastern boundary of this tract was drawn to exclude the stream, the pond, and the forge site from Auburn. The warehouse was on the left of the driveway near the gate" (Heite 1980:3). This transaction has much information that is probably relevant to 18FR320. It indicates the dam is probably in existence at this time, and locates a warehouse, which might be on or near the site. It is not impossible that F1 had been the warehouse, or that F4 had been used as a warehouse after the forge went out of use.

The question of the dam and its construction date is of crucial importance for site 18FR320. It is suggested that given the date of c.1845 for its construction cited by earlier researchers as well as the reference mentioned above, that a construction date sometime shortly after Fitzhugh's purchase of the property in 1843 is quite reasonable, and that the dam was one of the improvements he made to the property.

The assumption throughout this report has been that the dam postdated virtually all the activities on the site, based on the best interpretation of the stratigraphic evidence. However, that creates two major inconsistencies: what was powering the forge? and what was the dam powering? It would certainly be neater to put

dam and forge together and this would seem to be more in keeping with the oral tradition as well. But based on the evidence as it now stands, the phasing as described in Chapter VI is the best fit to the archeological data, and the inconsistencies will have to remain, as the area below the wheel pit and in the probable vicinity of the forge was not investigated below the heavy layer of slag fill.

In any case, the buildings on site 18FR320 must have been in a derelict condition from the time they were covered in part with various layers of water-washed gravel or sheet wash, layers which unfortunately could not be dated at all. It seems likely that all or part of 18FR-320 was on the "warehouse tract," and that, therefore, its connection with the furnace lands ceased before the mid-nineteenth century. It is suggested that the configuration of the land boundaries around the road (early Maryland 806 or the Frederick and Emmitsburg Turnpike) and pond seen identically on two late nineteenth century deed maps (1980 Figures 2 and 3 in Appendix 1) may have been established around mid-century. The scale of those maps obviously differs by a factor of about five, but examination of Figure 3 suggests that almost all of site 18FR320 is subsumed within Auburn lands, with the southwestern boundary perhaps coinciding with the north/south branch of F4.

There may have been quite a long hiatus before the deposition of the clay with flecks of rust. In the meantime, it is not impossible that another forge was in operation off the site being powered by the pond contained by Auburn Dam. There has always been a certain amount of difficulty in getting the "Old Forge" of 1858 to be in accord with the "forge" which seems to be within living memory, and possibly two successive forges or phases of the same forge on more or less the same site is the answer. The question of the clay with flecks of oxidized iron, and its connection to that possible second forge, has already been reflected on above. In any case, this is somewhat academic as it is clear that nothing of consequence was happening on site 18FR320 at that time.

C. Conclusions

The goals of the excavation at 18FR320 were stated in the introduction. To recapitulate, those were (1) to determine the extent of the ironworking horizons; (2) to determine details of ironworking technology; (3) to determine site chronology; and (4) to determine the functions of the structures. It is believed that these goals have been achieved to the extent possible for site 18FR320, with a few queries left unresolved largely because of inconclusive artifactual evidence. Thus, nothing in or about F1 suggested a definitive function for that structure; and while the relative site chronology is well understood, the lack of datable artifacts means the site is not securely tied into the historical sequence. However, the 20 year span between 1830 to 1850 is clearly the crucial period for the site's use and the spike of activity seen in the charcoal and slag layers equates most probably to the period of fluoresence of the accession of John Brien and John McPherson, less probably (if the dam and the forge producing those layers at 18FR320 are functionally associated) to the program of improvements surrounding Peregrine Fitzhugh's ownership.

The metallurgical program gave good substantiation to the contemporary claims of the superiority of the iron for casting purposes. Most importantly, perhaps, it necessitated the existence of a refining forge near the site in the first half of the nineteenth century, suggesting an empirical test by one of the iron manufacturers of Catoctin of the possibility of producing wrought iron from Catoctin pig. Judging by the almost complete absence of this forge from the records, it was probably not a success.

It is felt that the mitigation of adverse effects to site 18FR320, considered as a locus of activities ancillary to primary ironworking activities to the east (possibly including the first furnace at Catoctin, certainly including the refining forge) has been achieved. Virtually all of the area within F1 was excavated at least to the level of the floor; thus the inability to define its purpose is a function of the paucity of remains, while the portion of F4 unexcavated

was that which extended beneath the ditch and berm of U. S. Route 15 to the west. The sequence of activities within the site, and the horizontal location of features over the area to be impacted by the dualization of U. S. 15 are well documented and understood.

The question of the forge or forges outside the area of impact is that while the refining of iron and perhaps the casting of iron were taking place near site 18FR320, it was at a locus well outside the area of impact and probably, as indicated by earlier researchers, beneath the road (Maryland 806) or road fill. The relationship of 18FR320 and the forge site has been discussed; further excavation within the area of impact would be unlikely to add to the understanding of that relationship.

Accordingly, it is believed that the archeological research potential of site 18FR320 has been realized and that its significant information has been recovered. Since it is anticipated that this report will prove useful as a document not only to the State Highway Administration but also to public and private organizations concerned with the management and development of Catoctin's archeological and historical resources, some points which arise out of this work will be discussed, and some recommendations for directions which future research could fruitfully take will be outlined.

One point which perhaps is obvious, but needs to be explicitly stated, is the problem of site definition. Obviously, some breakdown of a complex as extensive, both chronologically and spatially, as Catoctin was, is necessary to study its component functional units. The difficulty is that this tends to impose a division on the material and limits on the study of it which are counterproductive to an understanding of how the units interrelated and worked together as a functional whole. It is well-understood that this is a problem confronted by every archeologist, indeed every researcher; lines have to be drawn somewhere in every discipline to demarcate areas of study. In this case, the mental line between site 18FR320

and the forge site was quite understandably given the initial prediction of a relatively early foundry and a relatively late forge, and was, of course, accentuated by the highway right-of-way line. In hindsight, it is clear that it fostered an approach which was not revised until the identification of the ferrous slag as refining slag.

NOTES

[1]While it can be assumed that virtually all of these elements were in the form of oxides, which oxides were present and in what proportion, particularly for the iron, is not known. Accordingly, the composition has been left as relative percentages of the elements detected. This should be taken into account when comparing these analyses with published analyses, which generally are in the form of percentages of oxides present.

[2]We are indebted to Robert Gordon for this reference.

[3]The site was reported by Beth Bower at the annual meeting of the Council for Northeast Historical Archaeology in Windsor, Canada, October 16-18, 1981. Slag samples from the site were supplied courtesy of Sheila Charles of the Museum of Afro-American History, Boston, Massachusetts.

[4]Professors in various universities, including Michael Notis, Department of Metallurgy and Materials Science, Lehigh University; David Gaskell, Department of Materials Science and Engineering, University of Pennsylvania; and Robert Gordon, Department of Geology and Geophysics, Yale University, were consulted on the possibility and/or likelihood of the ferrous slags being the product of a remelting furnace. The general consensus was that it was almost impossible to believe the iron content of such slags could be as high as in the Catoctin slag.

[5]The Musuem Applied Science Center intends to pursue this point by analyzing the slag samples from the Highland Foundry site.

[6]Unfortunately, the carbon content of these samples cannot be determined through PIXE analysis. Chemical analysis is now being undertaken, but the results will not be available for this report.

[7]This site was reported by Herbert Fisher at the annual meeting of the Society for Historical Archaeology in Philadelphia, Pennsylvania, January 7-10, 1982. A copy of the site report has been requested, but not yet received.

[8]Three wood samples from the fill of the raceway (F44) were sent to the Center for Wood Anatomy Research, U. S. Forest Products Laboratory, Madison, Wisconsin where they were identified as white oak (Quercus). All three samples had cut edges where they had been sawed and were representative of the type of wood remains found in the race fill. The identification of the wood as oak is more in keeping with a structural function for these timbers rather than fragments of flask molds.

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FIGURES

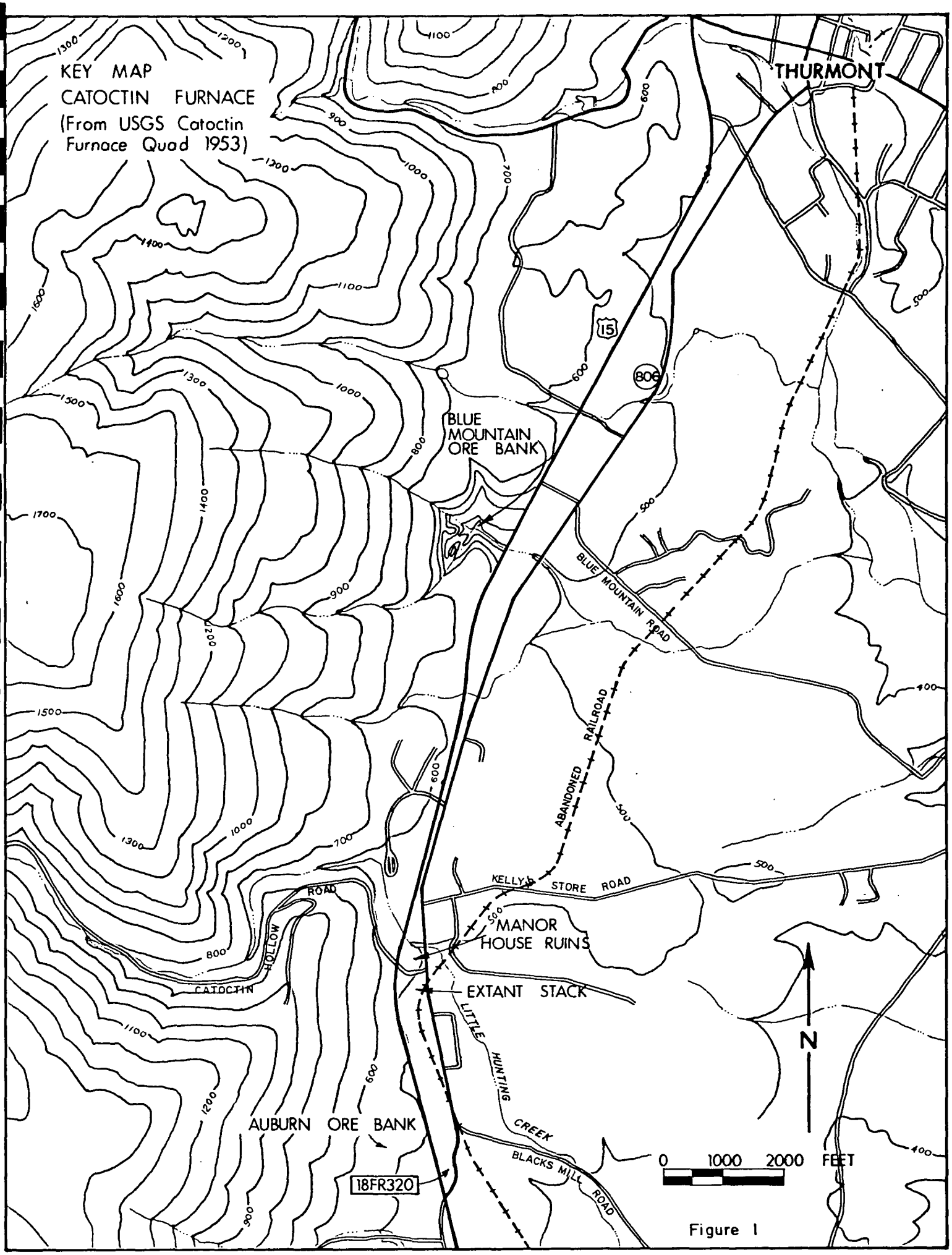

KEY MAP
CATOCTIN FURNACE
(From USGS Catoctin Furnace Quad 1953)
THURMONT
BLUE MOUNTAIN ORE BANK
BLUE MOUNTAIN ROAD
ABANDONED RAILROAD
KELLY'S STORE ROAD
MANOR HOUSE RUINS
EXTANT STACK
CATOCTIN HOLLOW ROAD
LITTLE HUNTING CREEK
BLACKS MILL ROAD
AUBURN ORE BANK
18FR320
15
806
N
0 1000 2000 FEET

Figure 1

EXISTING U.S. ROUTE 15

SHOULDER

PLAN OF EXCAVATION UNITS
1977 - 1981
SITE 18 FR 320
CATOCTIN , MARYLAND

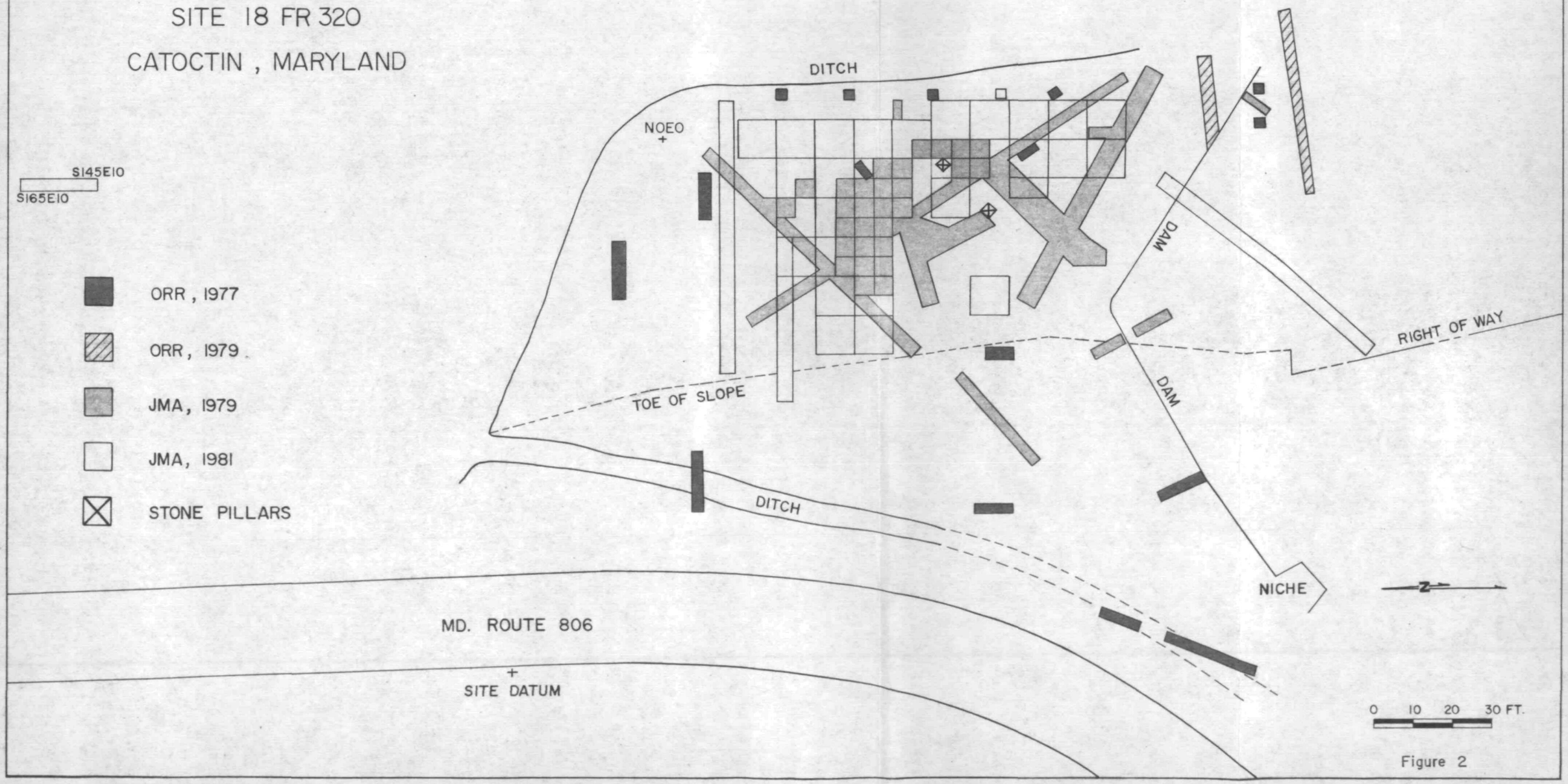


Figure 2

PLAN OF FEATURES
SITE 18 FR 320
1979 - 1981
CATOCTIN , MARYLAND

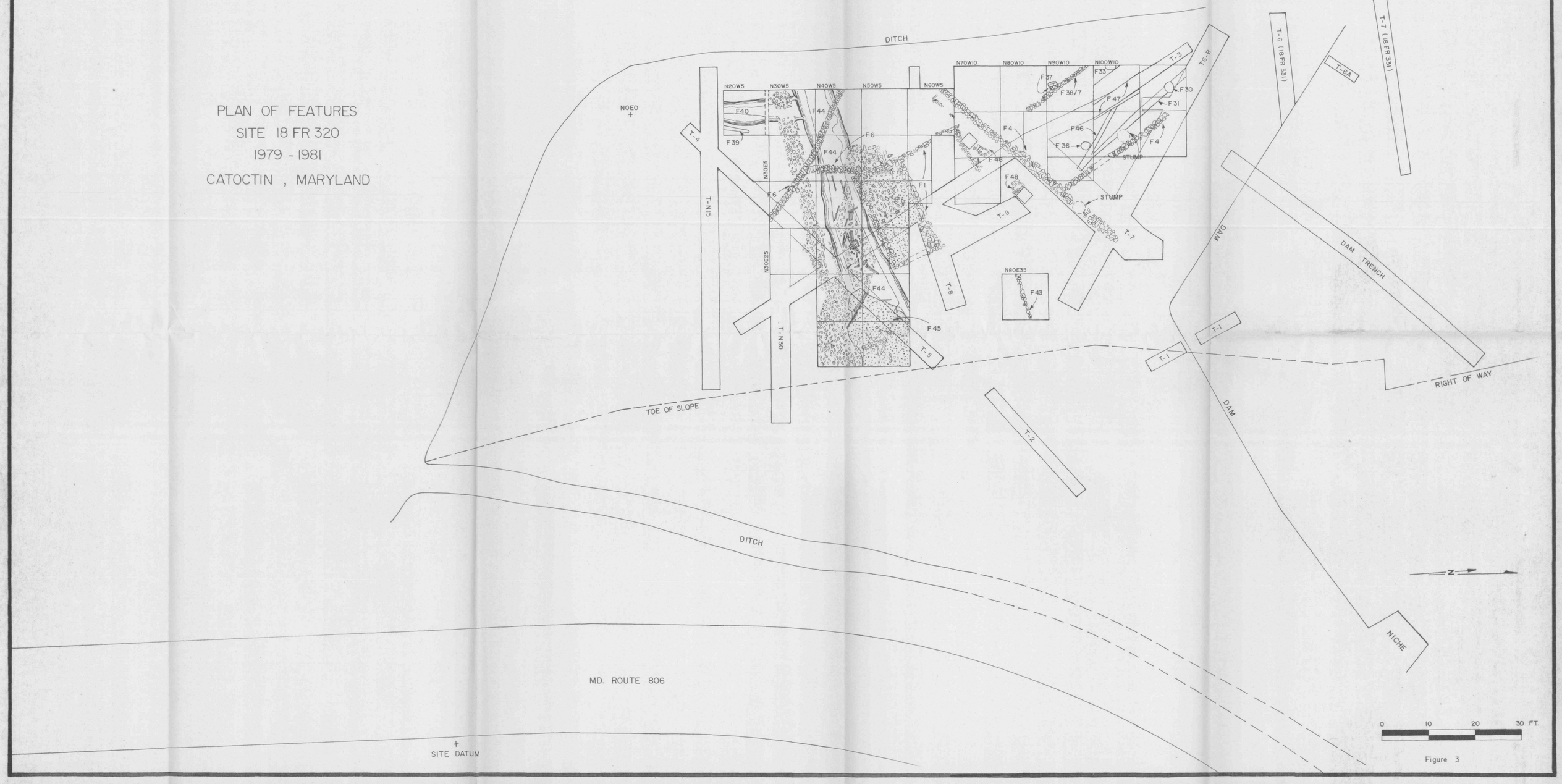


Figure 3

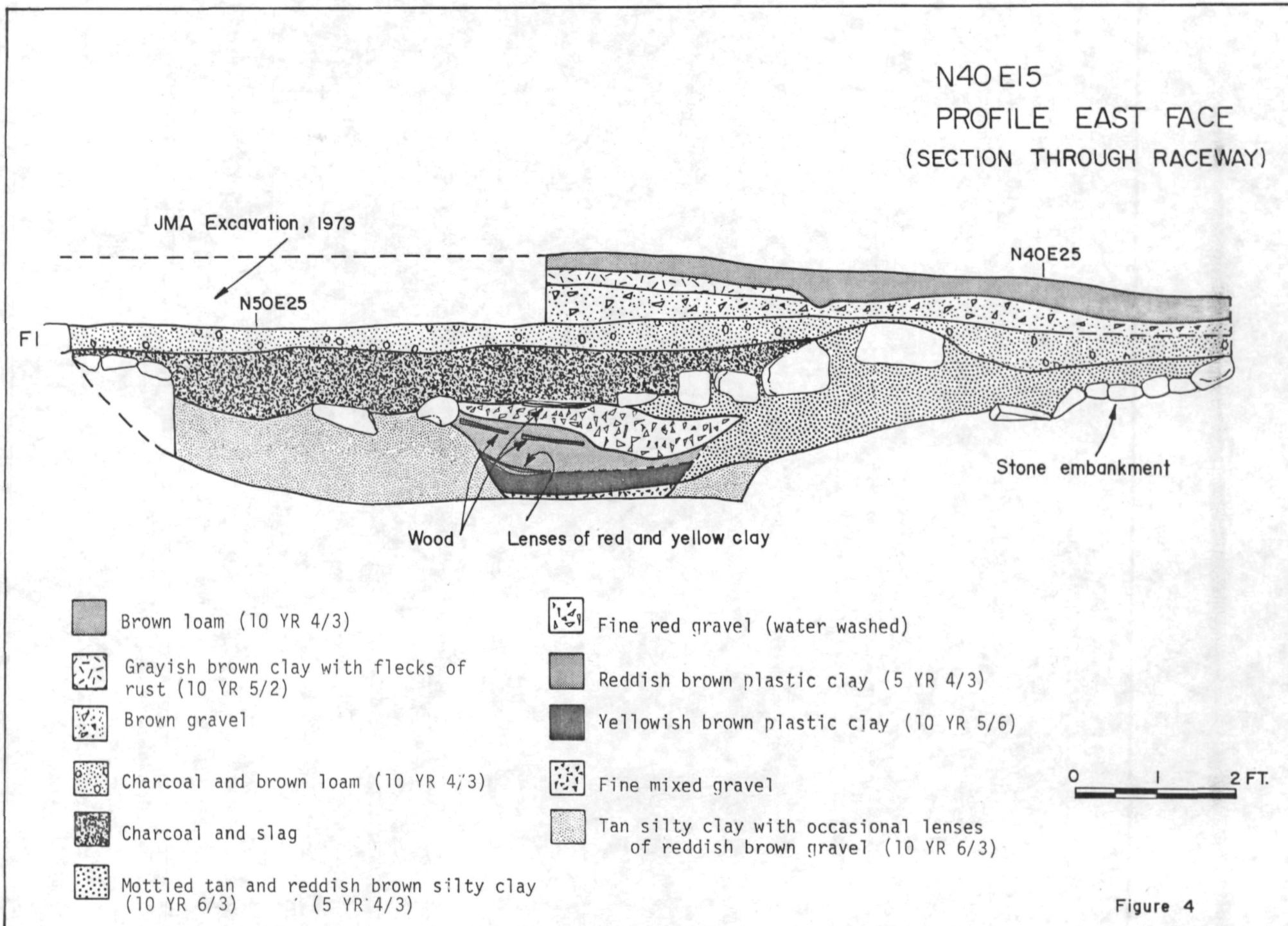
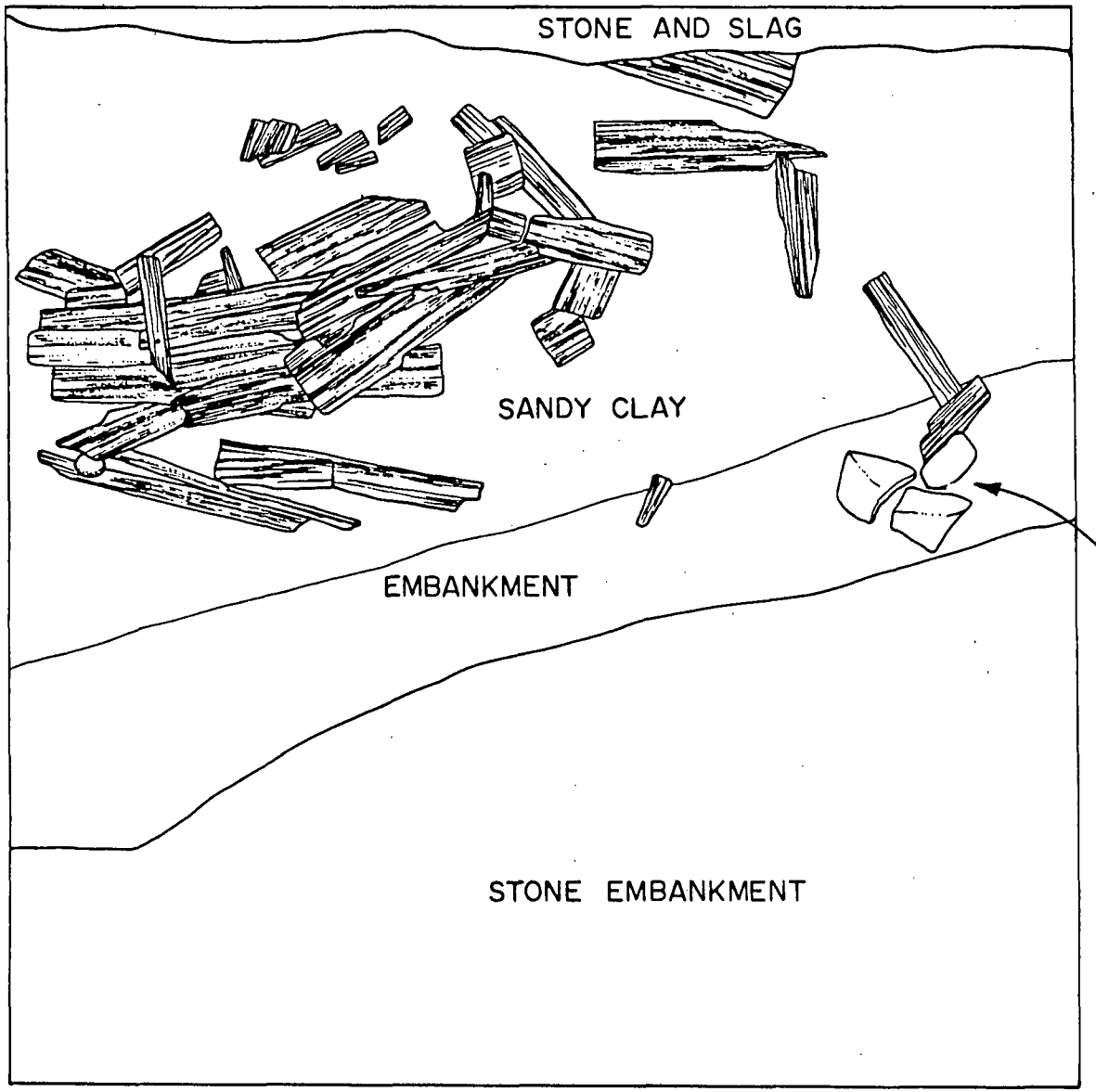

N40 E15
PROFILE EAST FACE
(SECTION THROUGH RACEWAY)
JMA Excavation, 1979
N50E25
N40E25
F1
Stone embankment
Wood
Lenses of red and yellow clay
Brown loam (10 YR 4/3)
Grayish brown clay with flecks of rust (10 YR 5/2)
Brown gravel
Charcoal and brown loam (10 YR 4/3)
Charcoal and slag
Mottled tan and reddish brown silty clay (10 YR 6/3) (5 YR 4/3)
Fine red gravel (water washed)
Reddish brown plastic clay (5 YR 4/3)
Yellowish brown plastic clay (10 YR 5/6)
Fine mixed gravel
Tan silty clay with occasional lenses of reddish brown gravel (10 YR 6/3)
0 1 2 FT.

Figure 4

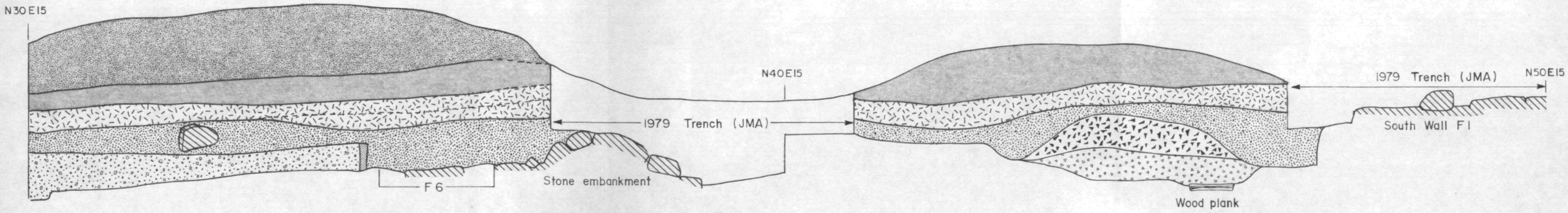


VIEW OF RACEWAY DURING EXCAVATION SHOWING THIN SHEETS OF WOOD IN SANDY CLAY

N40 E25

Figure 5

N30E15 , N40E15
PROFILE WEST FACE



Overburden

Brown loam (10YR 4/3)

Grayish brown clay with flecks of rust (10YR 3/2)

Mixed slag and charcoal

Compact slag

Mixed gravel

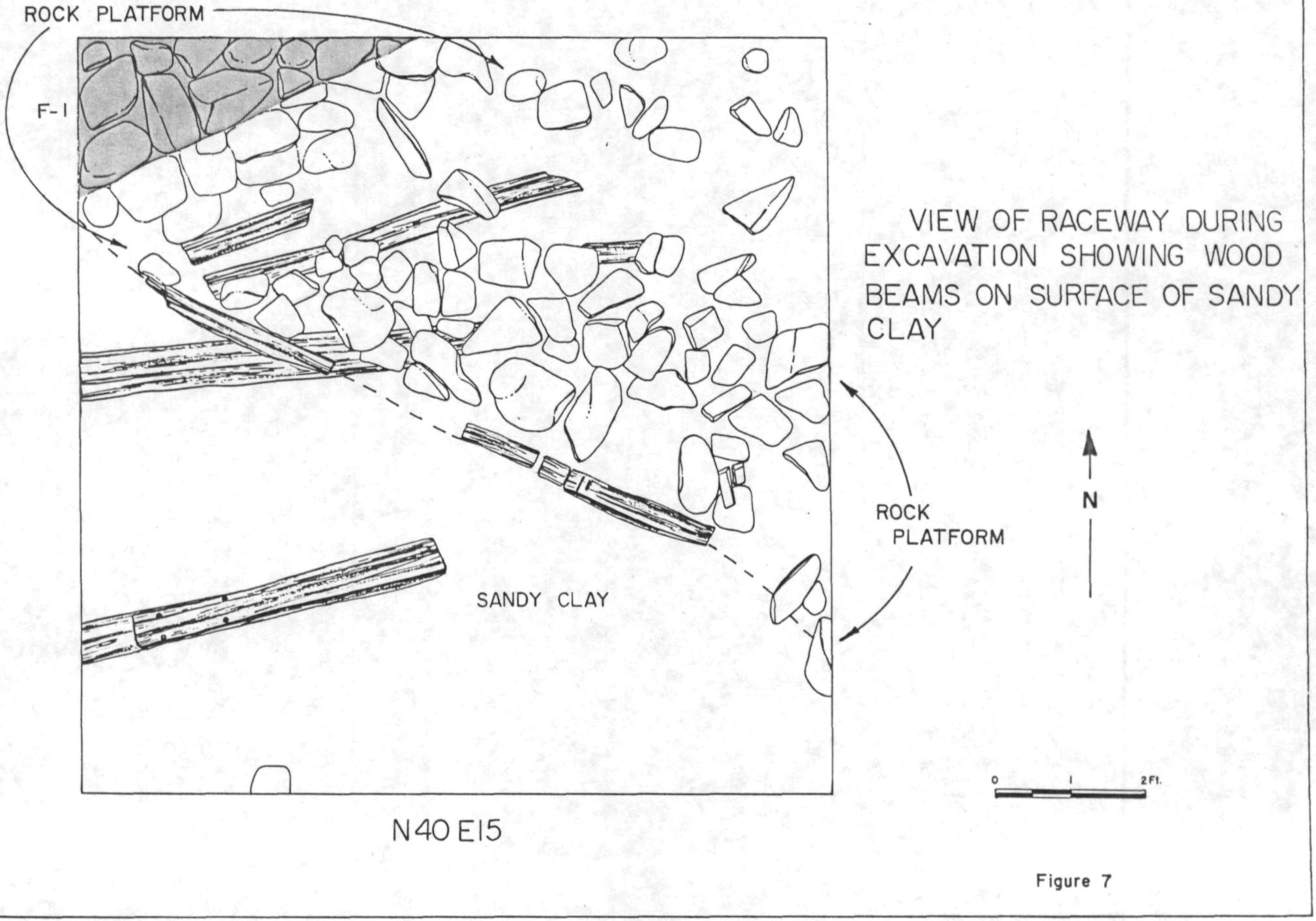
Compact red gravel

Brown silt (10 YR 4/3)

Stone

0 1 2 Ft.

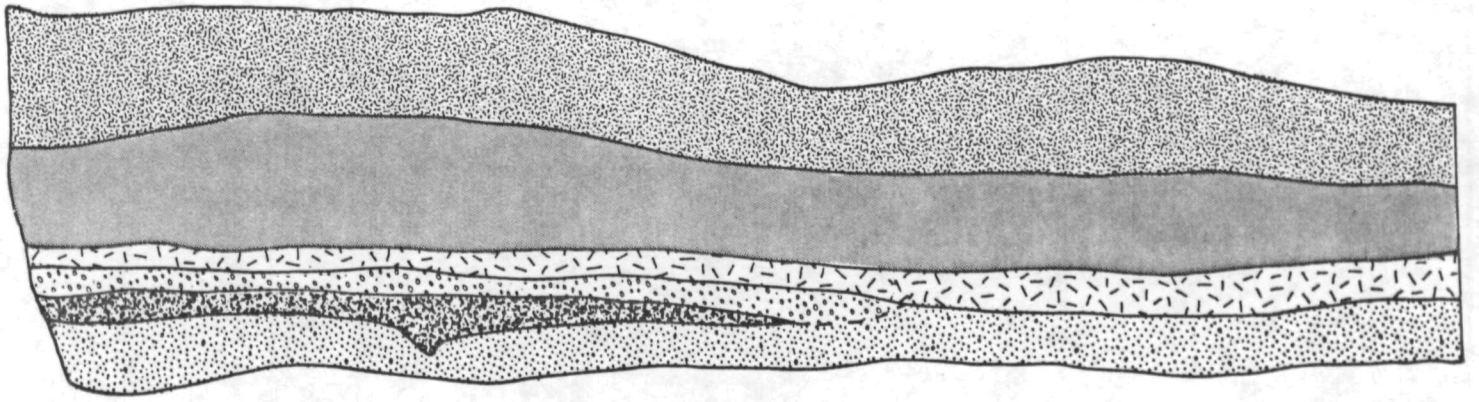
Figure 6



VIEW OF RACEWAY DURING EXCAVATION SHOWING WOOD BEAMS ON SURFACE OF SANDY CLAY

Figure 7

N50 W5
PROFILE NORTH FACE



Mixed overburden

Dark brown loam (10 YR 3/3)

Dark yellowish brown sandy clay with flecks of iron (10 YR 3/4) (F)

Reddish brown clayey sand (5 YR 4/4) (D)

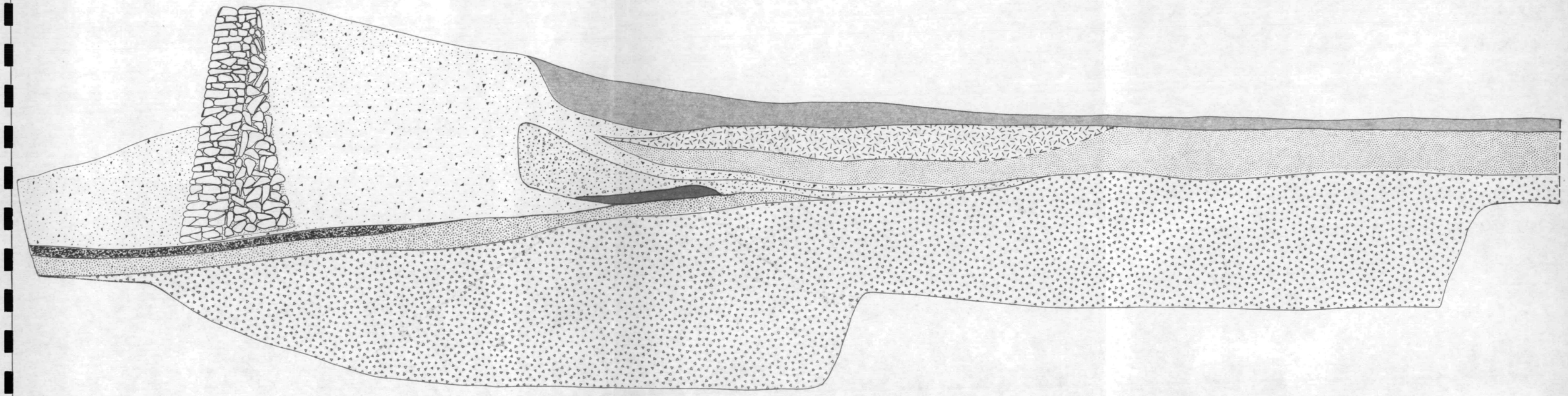
Charcoal (B)

Mixed slag and charcoal

0 1 2 FT.

Figure 8

AUBURN DAM TRENCH
PROFILE NORTHWEST FACE



0 2 4 Ft.

Dark red crumbly shale or mudstone fill (2.5 YR 4/6)

Dark yellowish brown loamy topsoil (10 YR 4/4)

Dark greyish brown clay (10 YR 4/2)

Dark yellowish brown sandy clay (10 YR 4/4)

Mottled brown slag fill

Dark brown clay (10 YR 4/3)

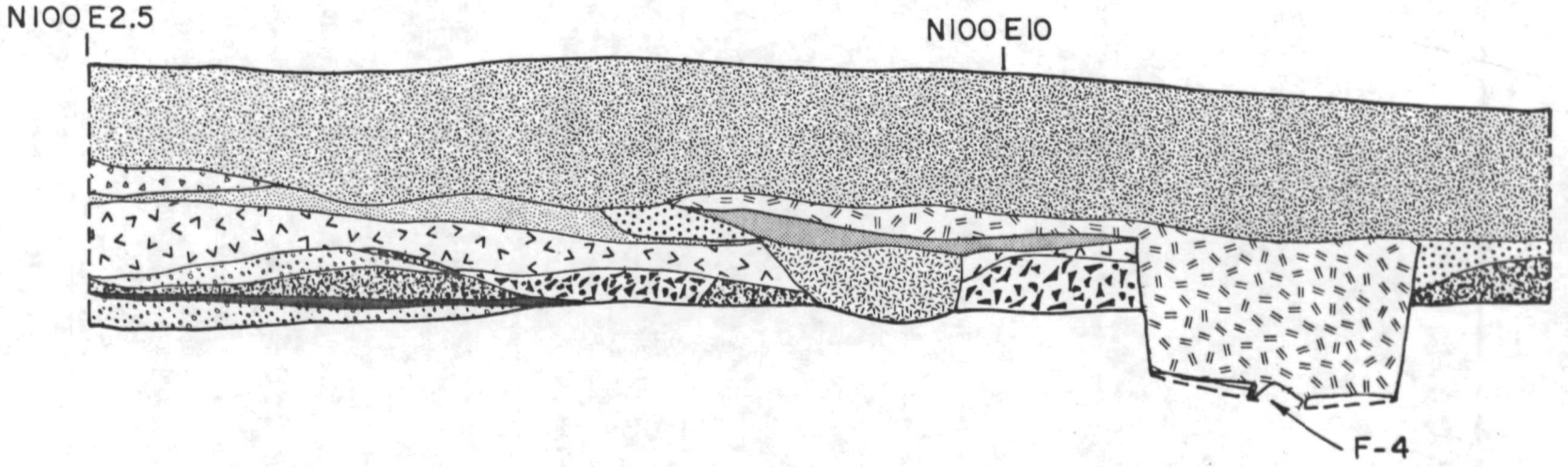
Charcoal (B)

Reddish brown subsoil with charcoal, brickbats, and slag (5 YR 4/4) (A)

Dark red mudstone or shale (2.5 YR 3/6)

Figure 9

N90 E0, N90E10
PROFILE NORTH FACE



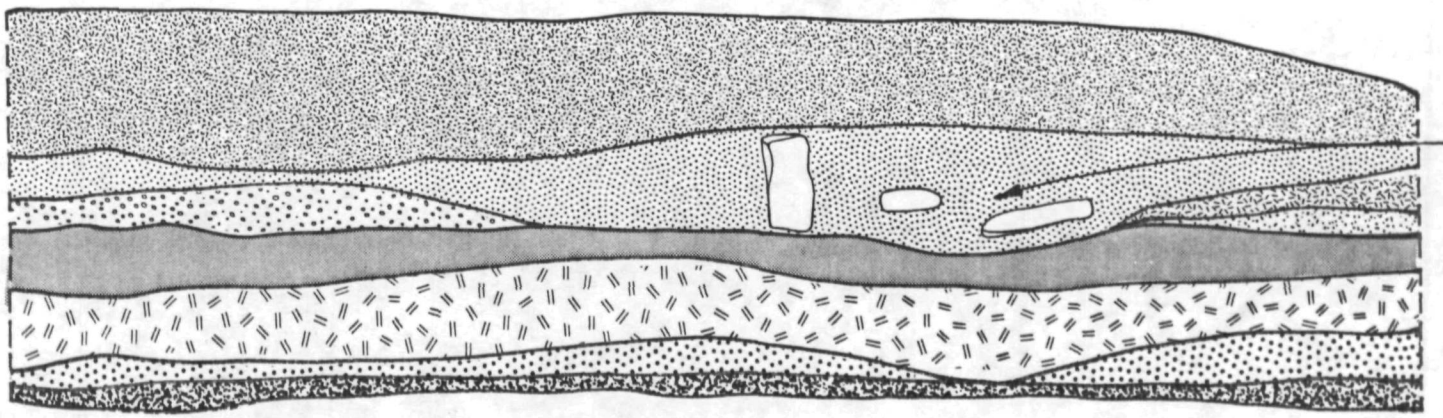
- Overburden, dark brown clay of base
- Yellowish brown crumbly shale (10 YR 5/4)
- Yellowish brown clayey gravel (10 YR 5/6)
- Mixed grayish brown gravelly soil (10 YR 3/2)
- Dark reddish brown clayey soil (5 YR 3/4)
- Dark yellowish brown clay (10 YR 4/6)
- Dark reddish brown gravelly soil (5 YR 3/4) (D)
- Feature 31 - dark yellowish brown gravel (10 YR 3/6)
- Dark gray gravel with charcoal (10 YR 3/1)
- Charcoal (B)
- Dark red clay (5 YR 3/4)
- Brown sand (7.5 YR 5/4) (C)

0 1 2 FT.

Figure 10

N80W10

PROFILE NORTH FACE



Overburden

Dark brown clayey loam (10 YR 3/3)

Grayish brown gravelly sand (10 YR 3/2)

Dark yellowish brown sandy clay (10 YR 3/4) (G)

Brown sand (10 YR 4/3) (G)

Dark yellowish brown clay (10 YR 4/6) (F)

Dark grayish brown clayey gravel (10 YR 3/2) (D)

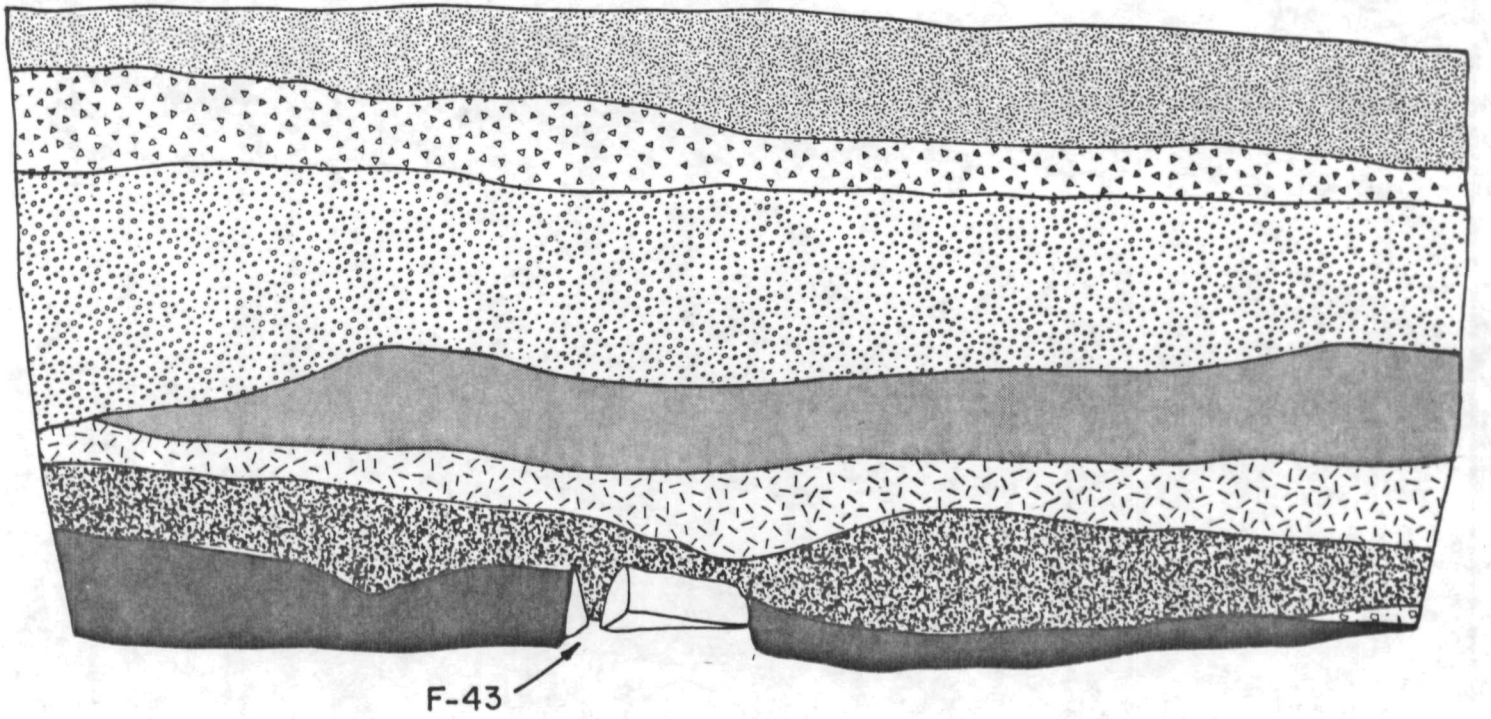
Dark yellowish brown sand (10 YR 4/4) (C)

Charcoal (B)

0 1 2 FT.

Figure 11

N80 E35
PROFILE EAST FACE



Brown crumbly top soil (7.5 YR 3/2)

Dark reddish-brown shale fill (5 YR 3/4)

Yellowish-brown sandy clay fill (10 YR 5/6)

Reddish brown clay and shale fill (5 YR 4/4)

Dark brown sandy clay (10 YR 3/3) (F)

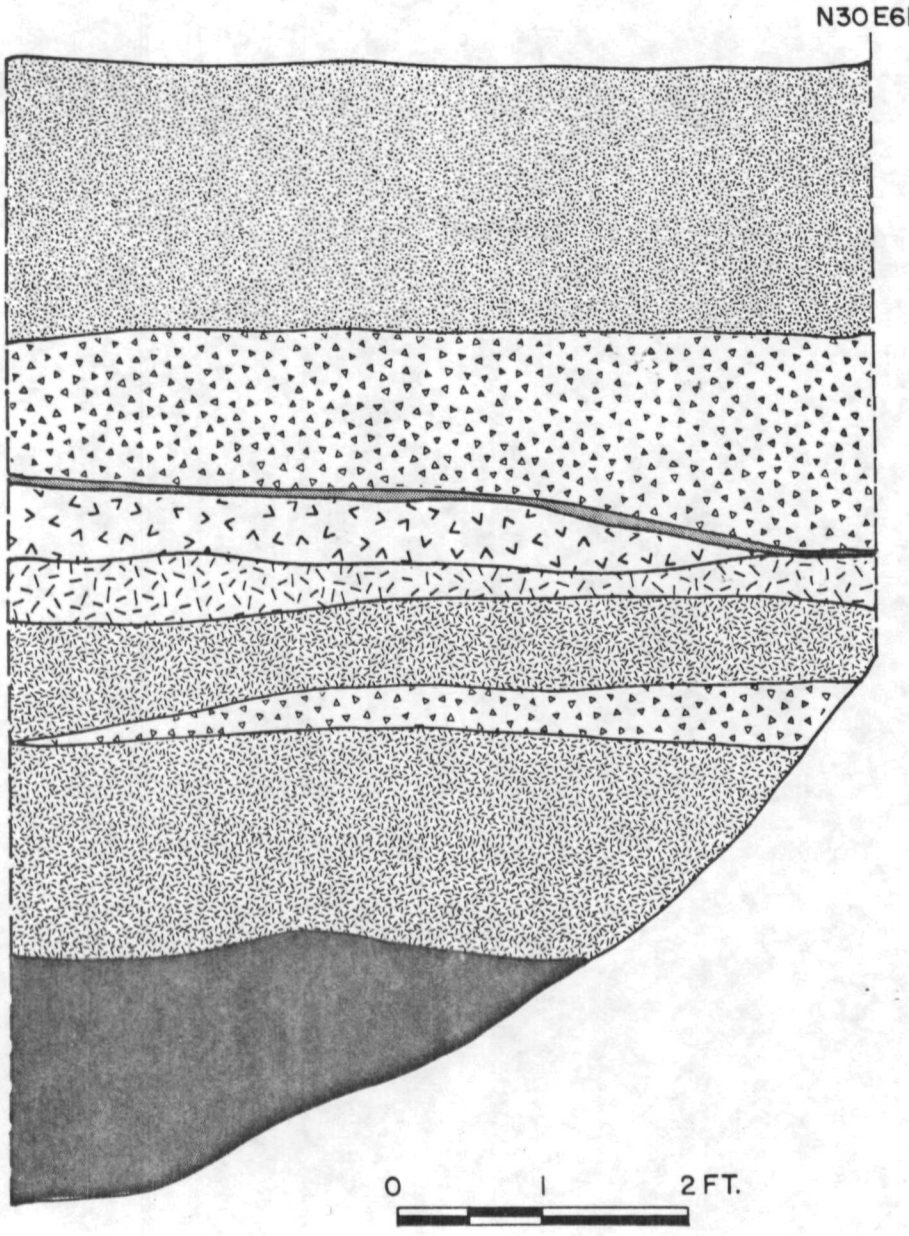
Charcoal and slag (B)

Yellowish-brown sandy clay and mortar (5 YR 5/6)

Dark reddish brown clay (5 YR 3/4) (A)

0 1 2 Ft.

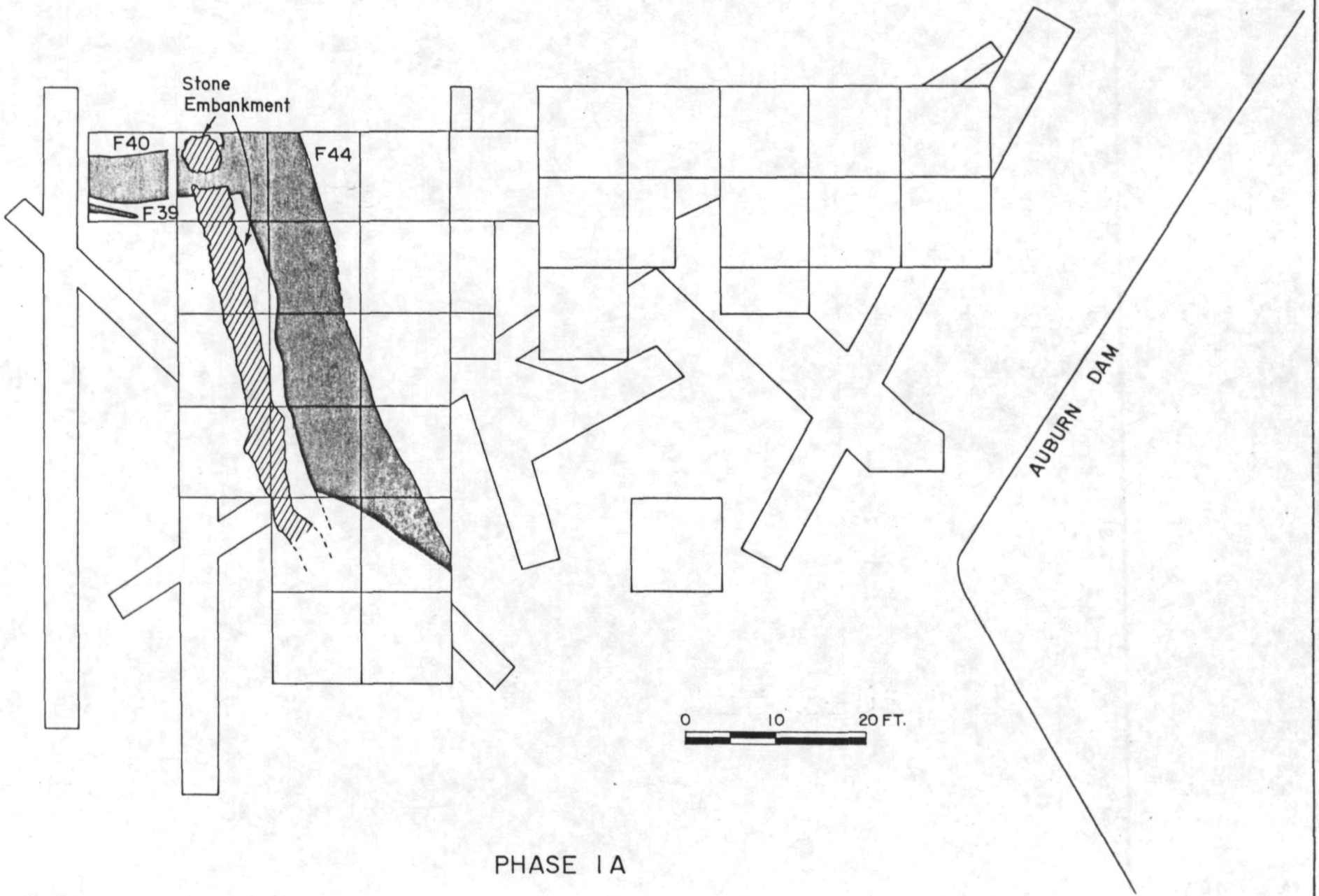
Figure 12



N30E60
PROFILE SOUTH FACE

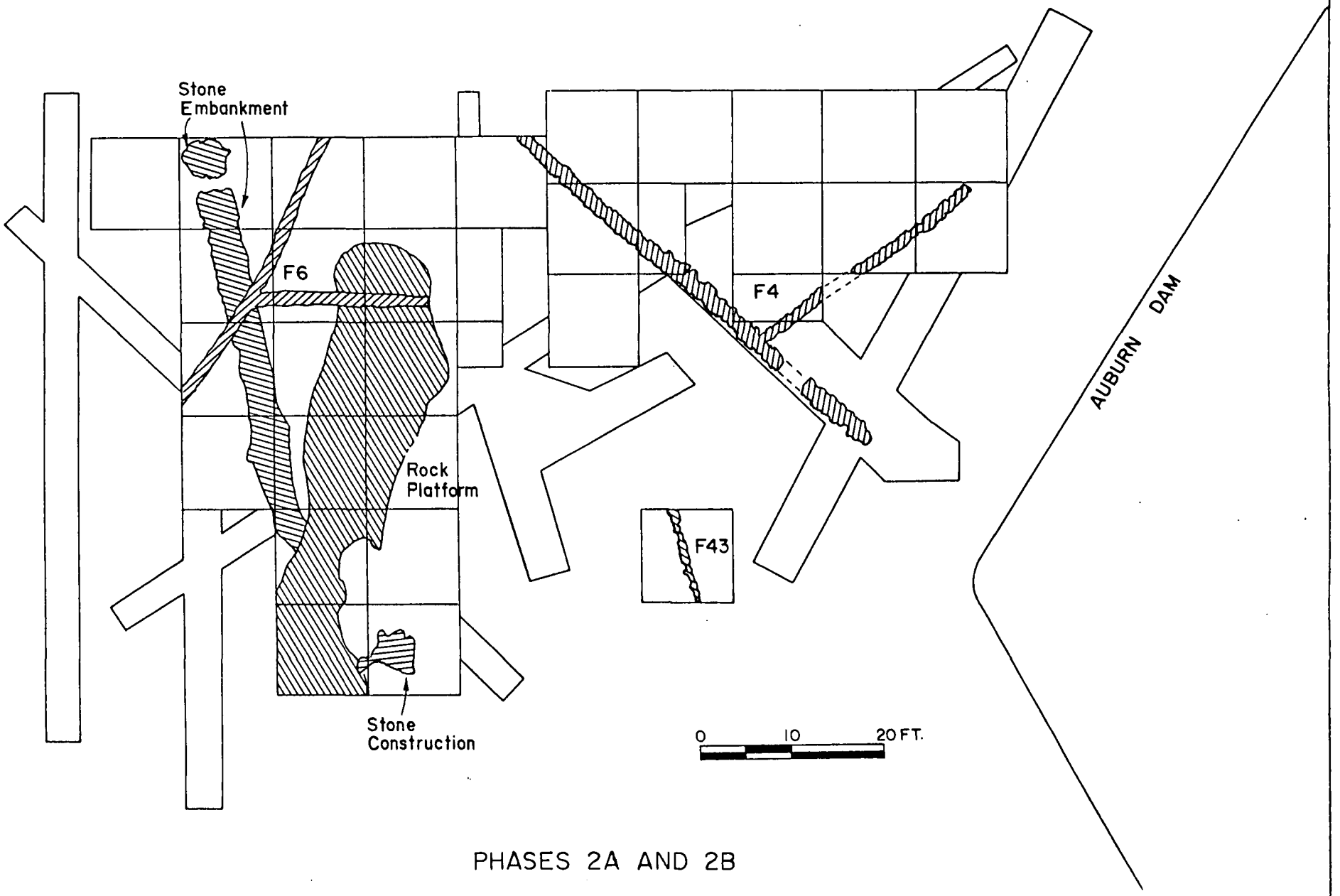
- Mixed yellow and gray clayey fill
- Crumbly red shale (2.5 YR 3/6)
- Dark gray clay (10 YR 3/2)
- Brownish yellow clayey sand with quartz pebbles (10 YR 6/6)
- Dark brown clayey sand (10 YR 3/3)
- Dark reddish brown sand (5 YR 3/3)
- Dark reddish gray clay (5 YR 4/2)

Figure 13



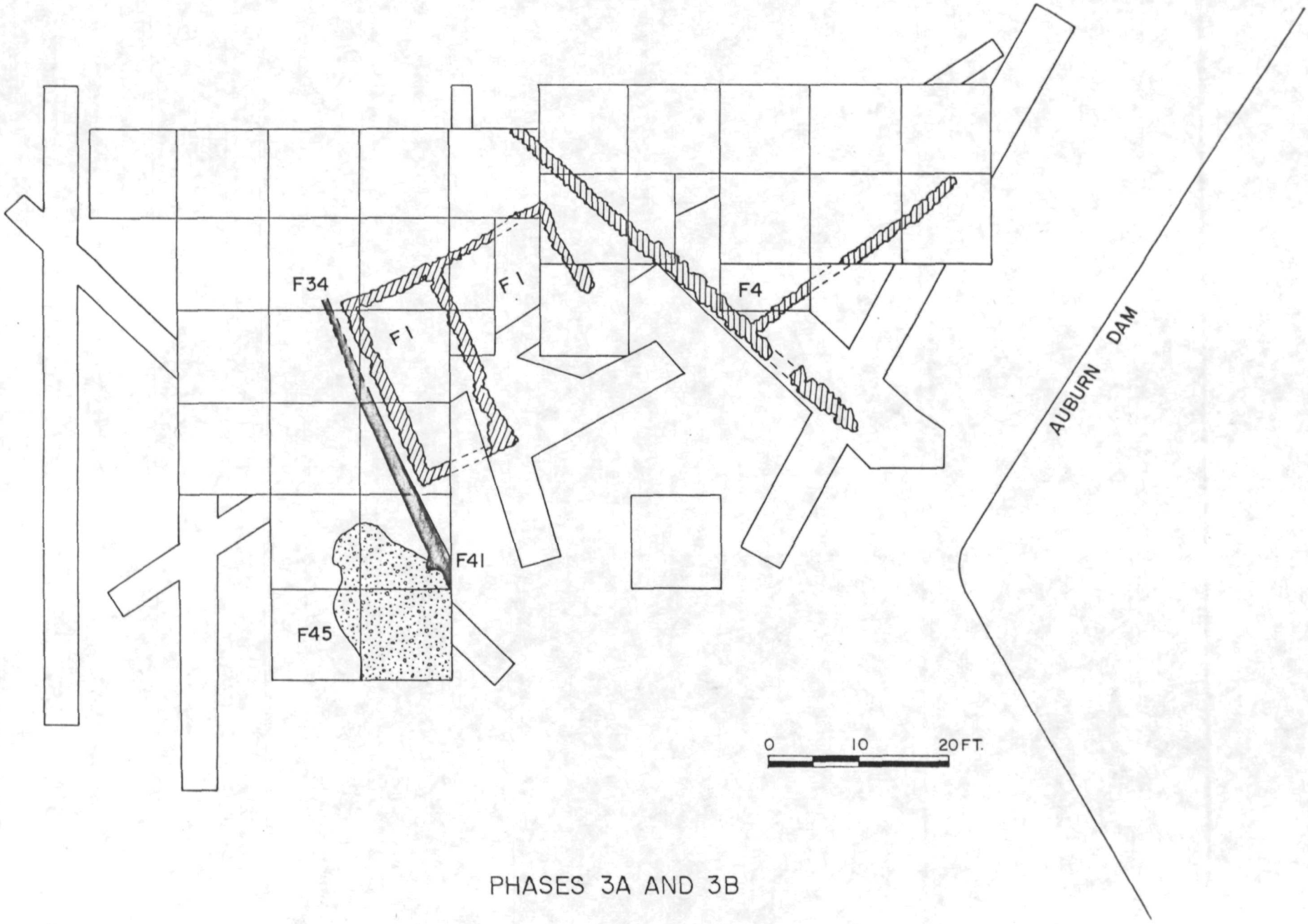
PHASE 1A

Figure 14



PHASES 2A AND 2B

Figure 15



PHASES 3A AND 3B

Figure 16

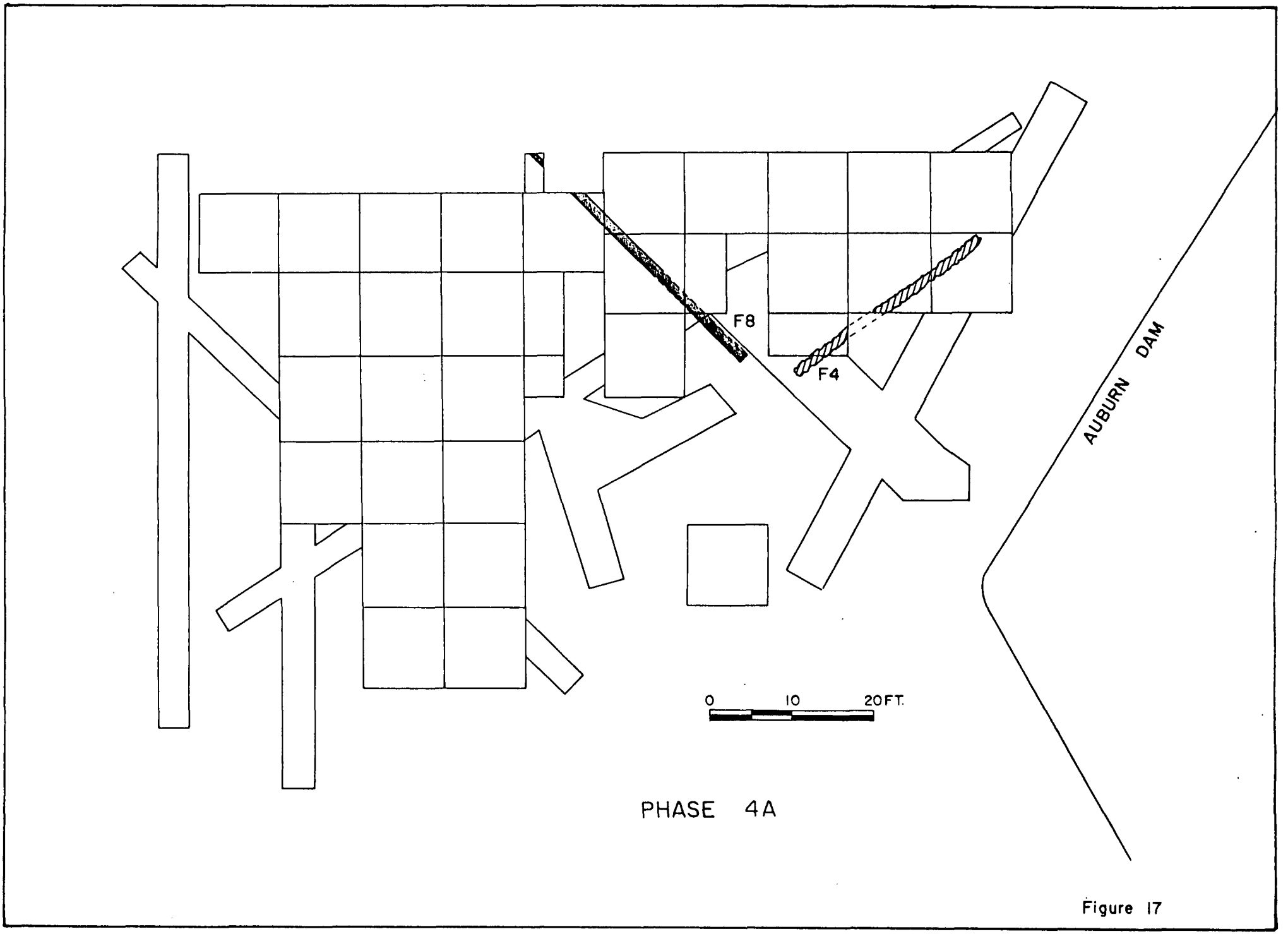
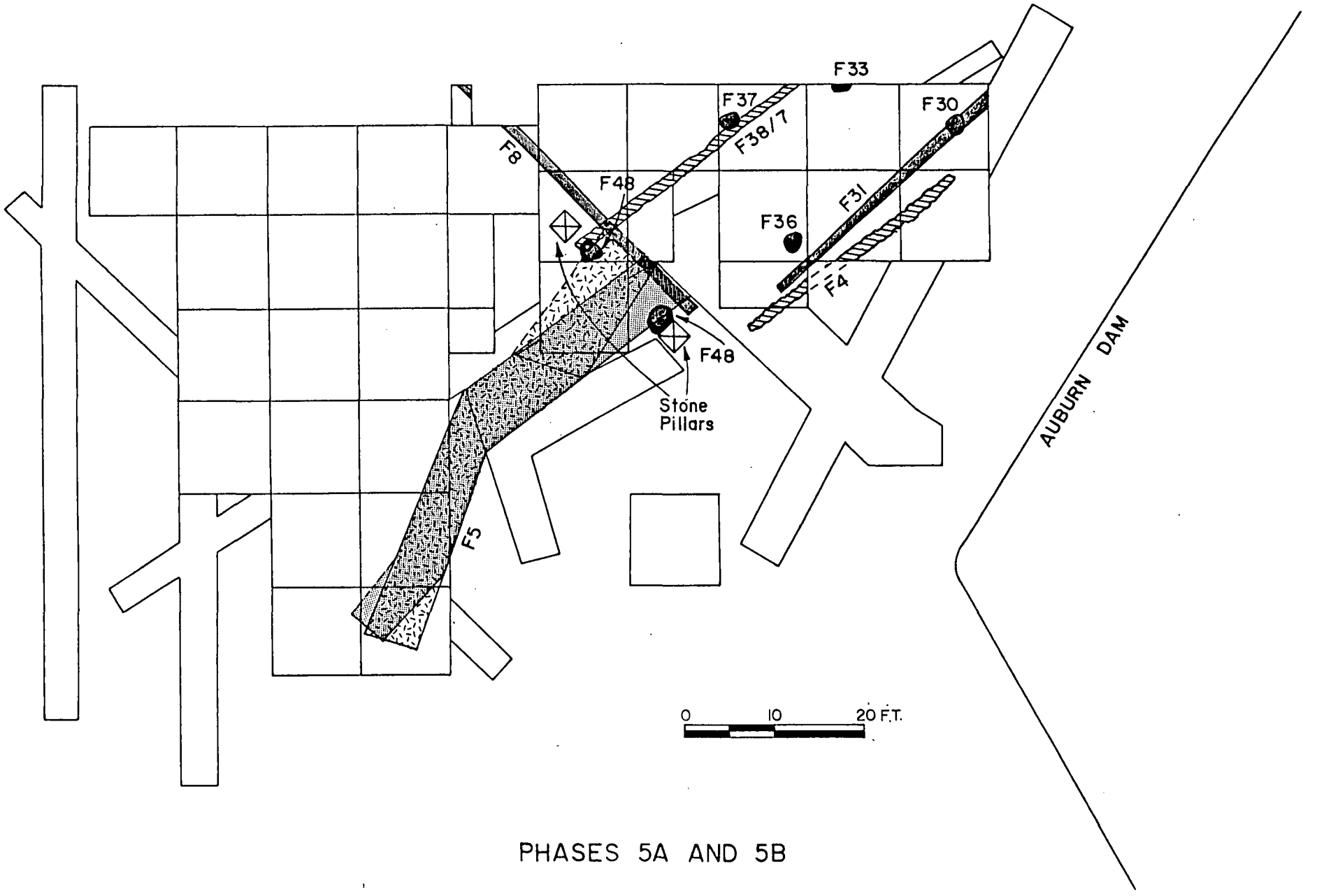
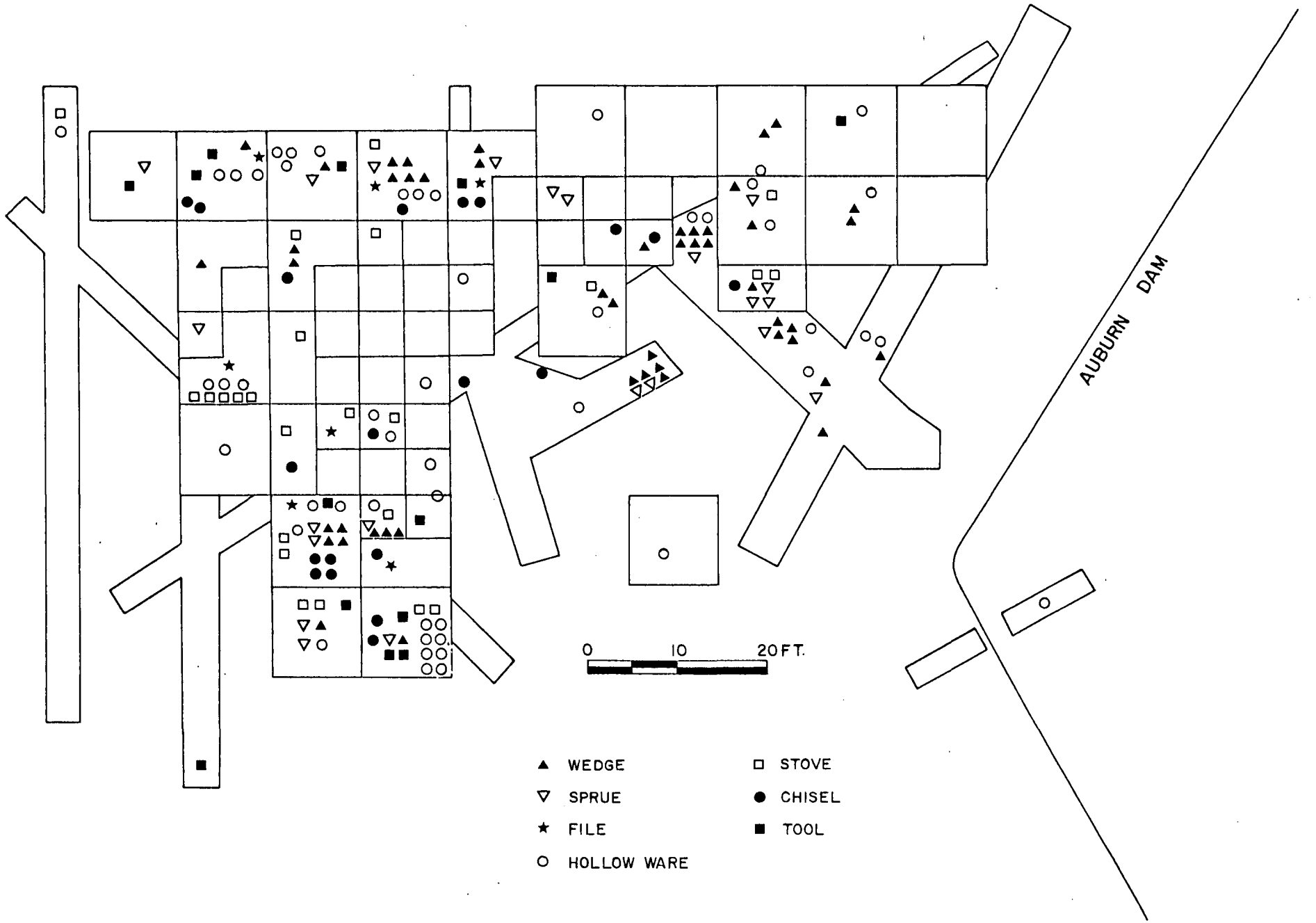


Figure 17



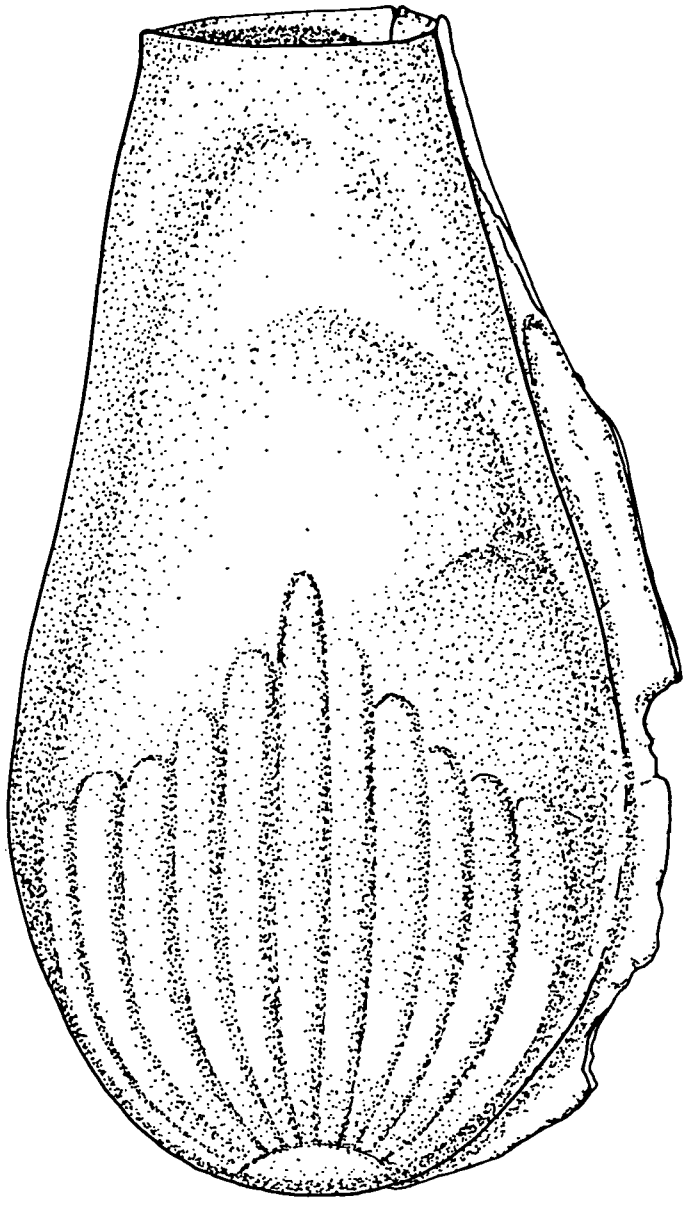
PHASES 5A AND 5B

Figure 18



SPATIAL DISTRIBUTION OF DIAGNOSTIC ARTIFACTS

Figure 19



(Actual Size)

POWDER FLASK FOUND IN RACEWAY FILL

Figure 20

PLATES

Plate 1: View of F44 and the rock platform towards the end of the fieldwork season from grid squares N40W5 to N40E35. The stone embankment is on the left. The rock platform has been partially excavated through. The stone construction is in the foreground. The camera is facing west.

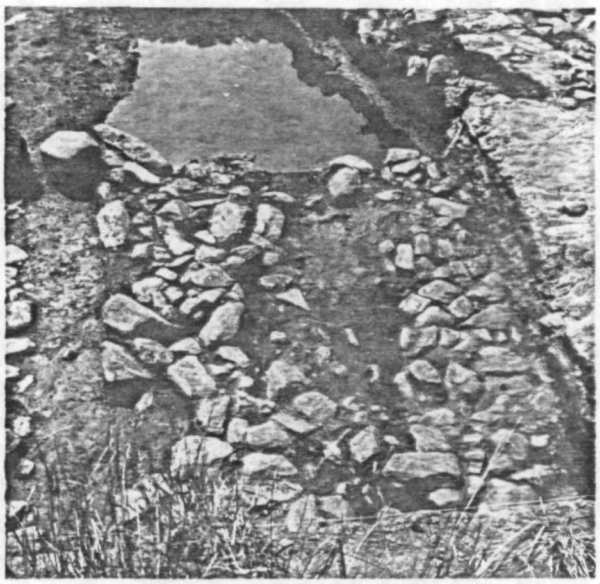


Plate 2: Grid square N40E25 with the camera facing west. In the foreground is the gap in the rock platform with the hard gray clay with many pieces of wood.

Plate 3: F45 in grid square N55E45. The plank of wood can be seen in the middle of the photograph. The camera is facing west and the scale is five feet.

Plate 4: Grid square N40E15 showing the "edging" of wood along the hard-packed slag surface of the rock platform. The red gravel has been excavated out of the depression running through the square. In the foreground is the stone embankment in grid square N30E15. The camera is facing north and the scale is five feet.

Plate 5: The western grid squares showing F6 in the foreground, crossing F44 and intersecting with F1 in the background. The west end of the rock platform is also visible and the stone embankment is in the foreground. The camera is facing north and the scale is five feet.

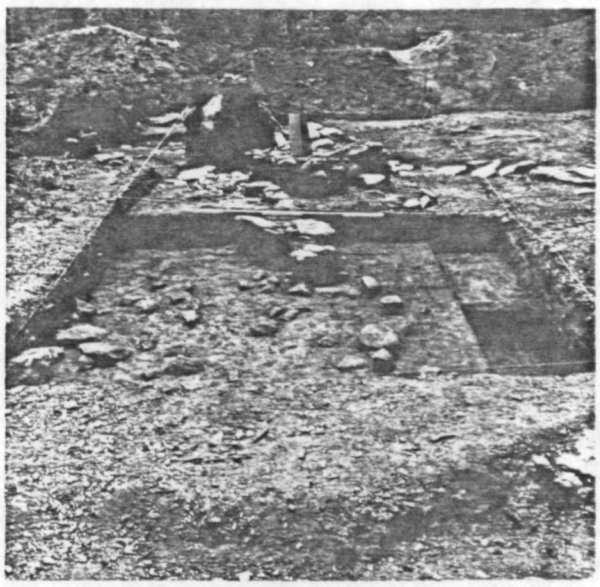


Plate 6: Grid squares N70E0 and N70E10. In the middle ground is the north wall of F1 (north) pedestalled above the dark reddish-brown silty clay. In the background are a tree stump and the base of the southwest Auburn Mansion pillar. To the right is F4. The camera is facing west and the scale is five feet.

Plate 7: Grid square N100W10 showing the north/south branch of F4. In the foreground is 1979 T-6B. F31 is to the left of F4. The camera is facing southeast.

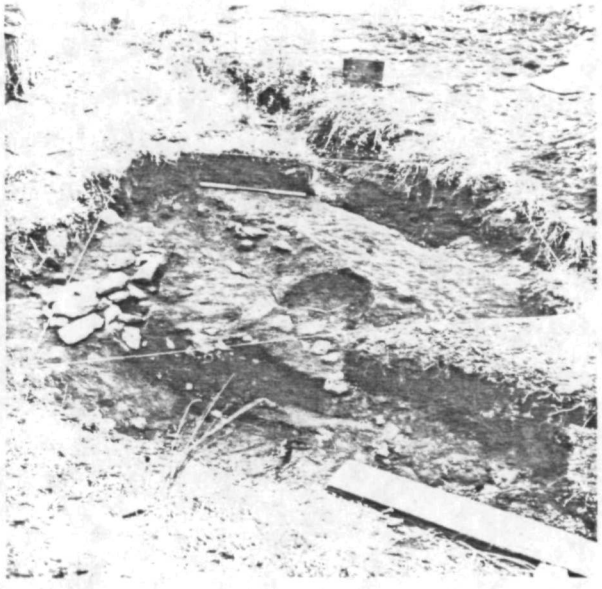


Plate 8: Grid square N110W10. F30 and F31 are visible. The stones to the left are probably from F4 as disturbed in the excavation of T-6B in the foreground. The camera is facing south and the scale is three feet.

Plate 9: Excavation of machine trench through the Auburn Dam. Camera is facing northeast.

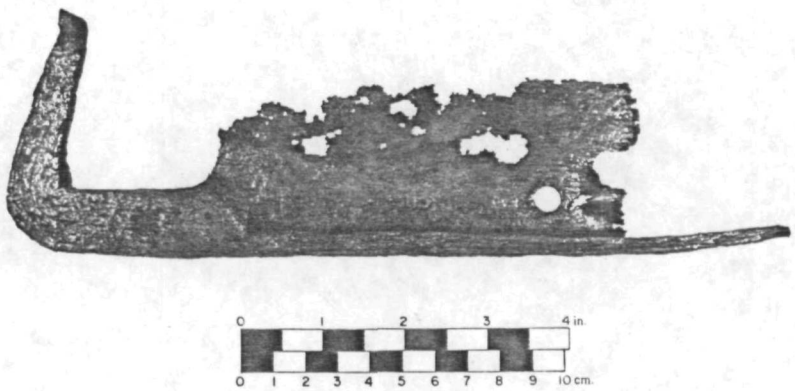


Plate 10: Wrought iron drawknife, excavated in N30 trench, lot 2.

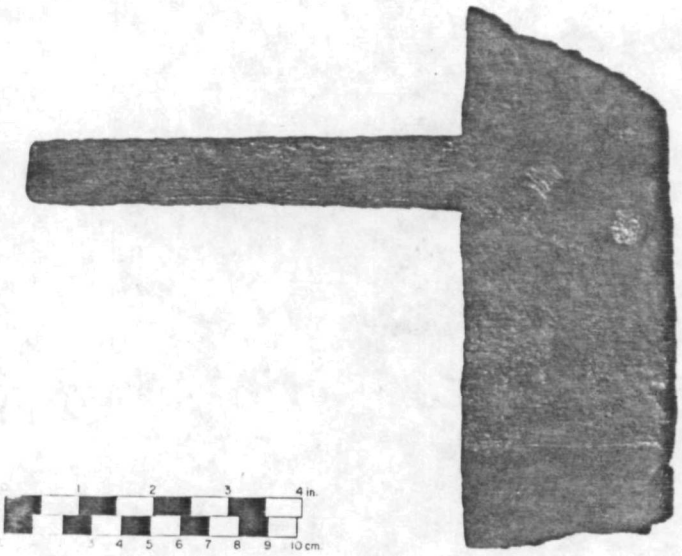


Plate 11: Composite cast and wrought iron artifact, excavated in N50E25, lot 8

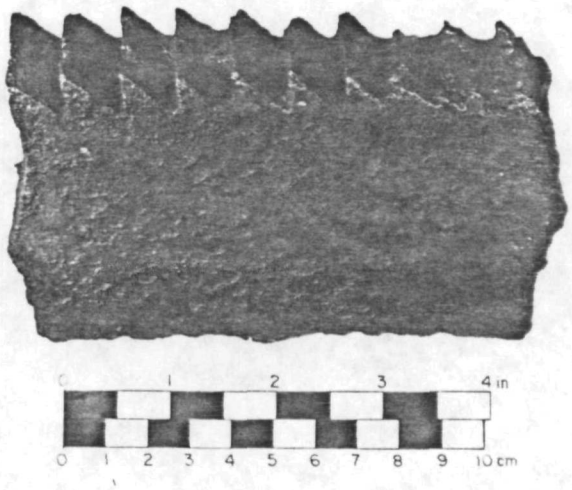


Plate 12: Cast iron gearing wheel fragment, excavated in N60E45, lot 37.

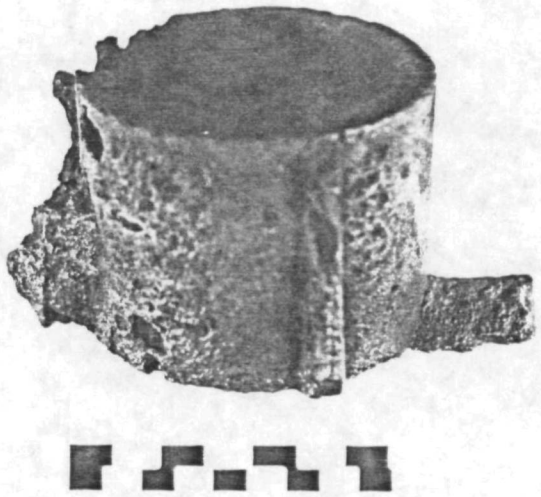


Plate 13: Cast iron wagon box, excavated in N60E45, lot 37.

Plate 14: Cast iron flask clamp, excavated in N50E45, lot 11.

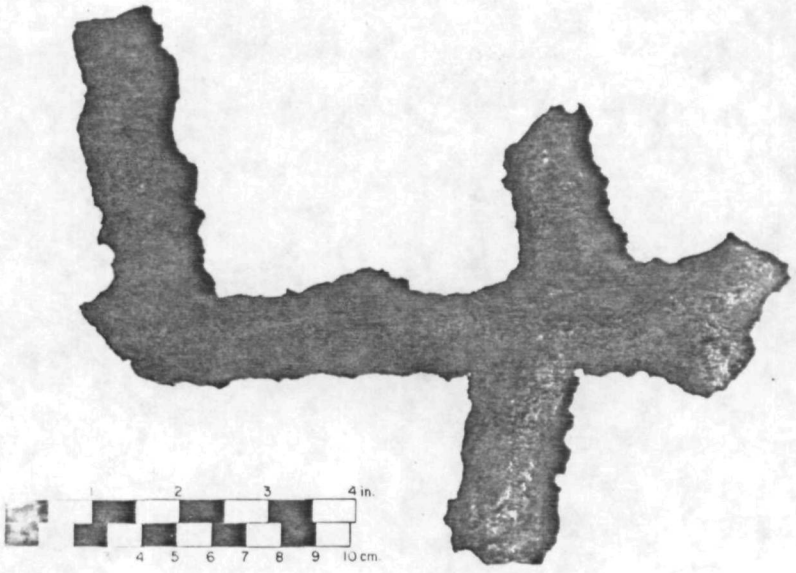


Plate 15: Cast iron runner, excavated in N80E35, lot 35.

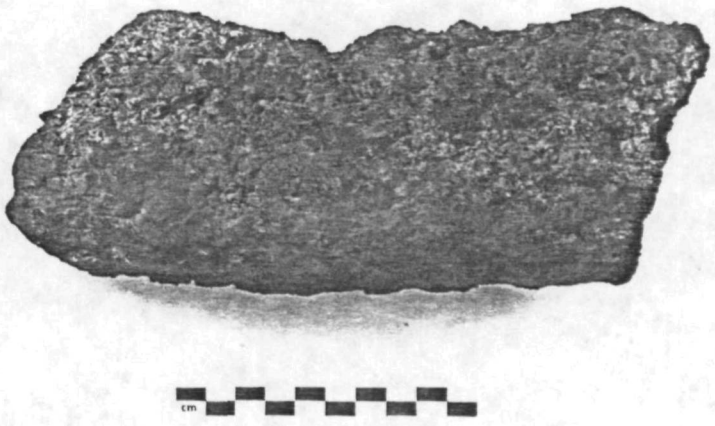


Plate 16: Sample of ferrous slag, MASCA lab number 6.
(Photograph courtesy of Nicholas Hartmann, MASCA)

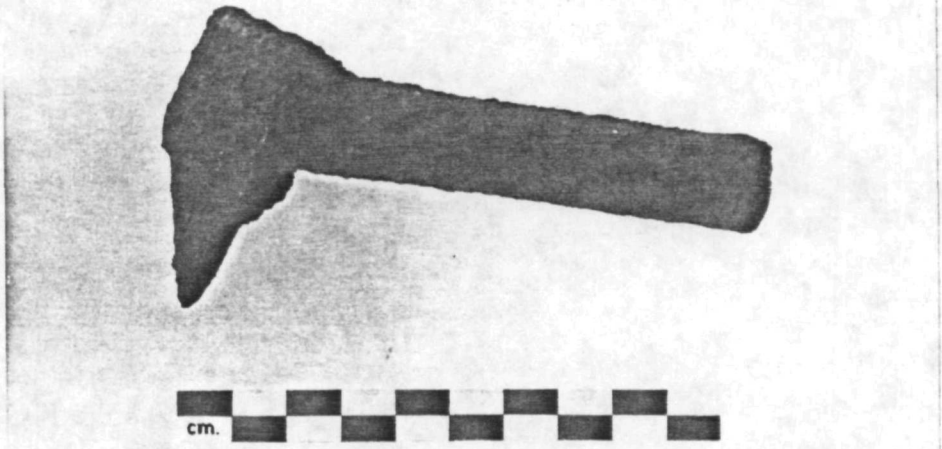


Plate 17: Cast iron sprue or riser, excavated in N40E35, lot 26, MASCA lab number 1. (Photograph courtesy of Nicholas Hartmann, MASCA)

Plate 18: Handle ear from cast iron vessel, excavated in N30E25, lot 6, MASCA lab number 3. (Photograph courtesy of Nicholas Hartmann, MASCA)

Plate 19: Fragment of cast iron pig, excavated in N30E25, lot 6, MASCA lab number 14. (Photograph courtesy of Nicholas Hartmann, MASCA)

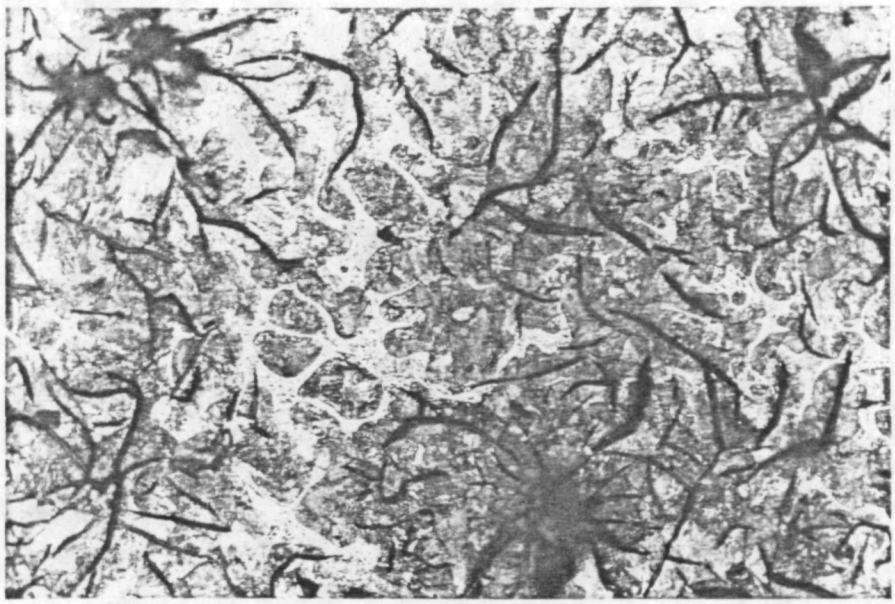


Plate 20: Micrograph of gray cast iron (#1) as polished (not etched), showing Type A flake graphite of random orientation and uniform distribution (X100). (Photograph courtesy of Nicholas Hartmann, MASCA)

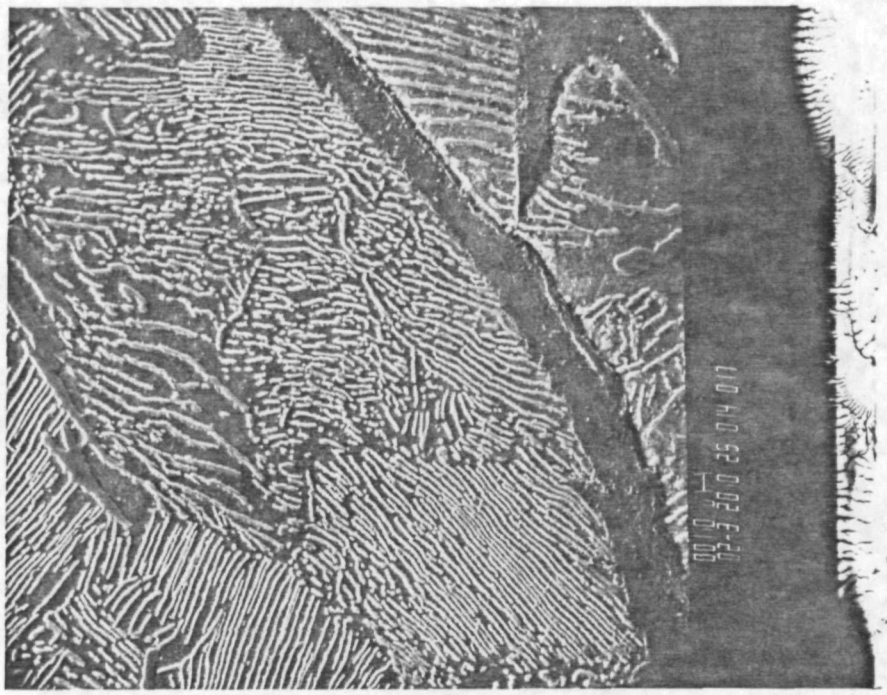


Plate 21: Scanning electron micrograph of pearlite around graphite rosette in white cast iron (#14), showing lamellae of iron carbide and ferrite; graphite flake extends across right side of field (X2000). (Photograph courtesy of Heidi Moyer, Lehigh University)

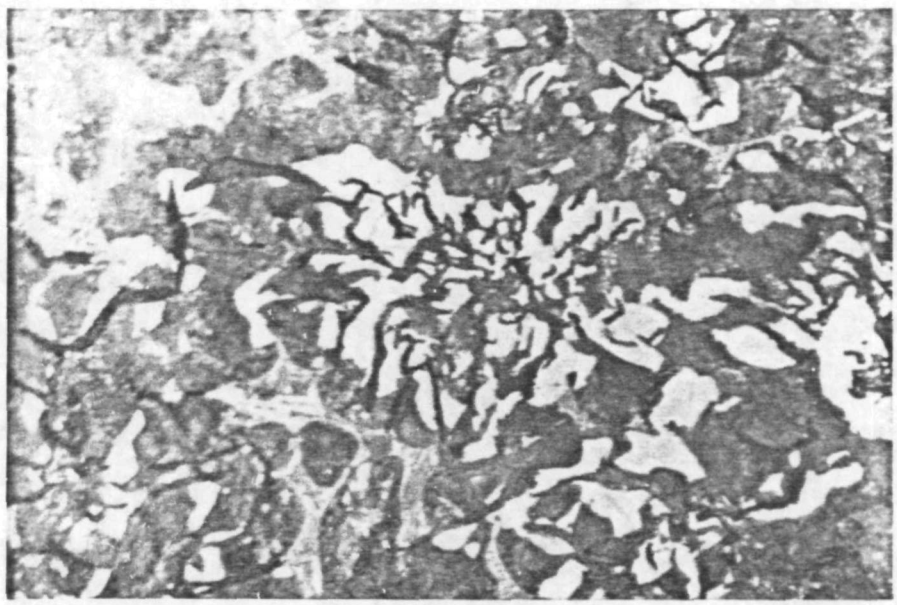


Plate 22: Micrograph of gray cast iron (#5), etched with 2 percent nital, showing phospide eutectic (white speckled), graphite flakes (black) and pearlite (gray) (X2000). (Photograph courtesy of Nicholas Hartmann, MASCA)

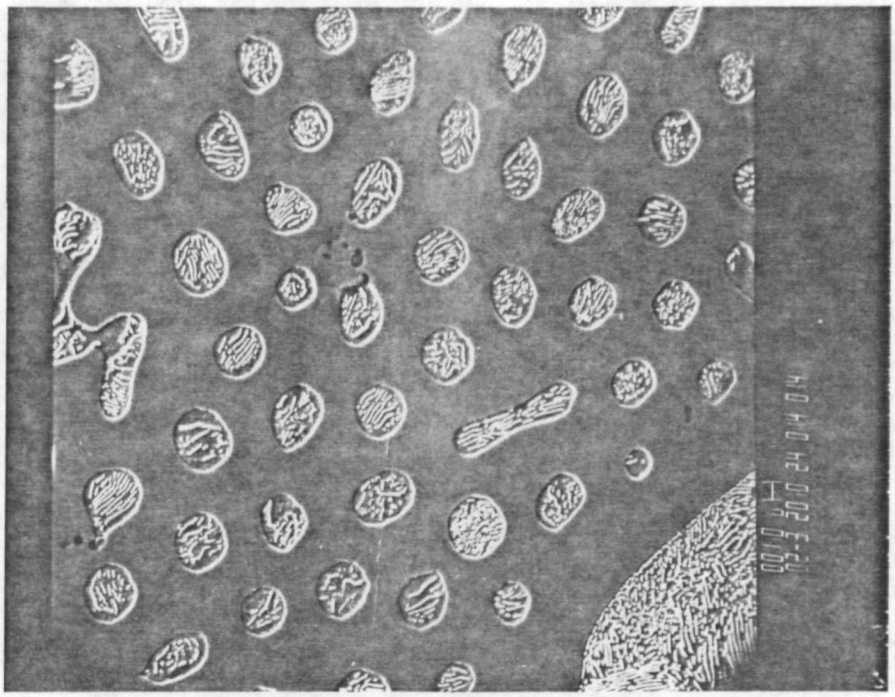


Plate 23: Scanning electron micrograph of white cast iron (#14), showing ledeburite eutectic resolved, iron carbide around nodules of pearlite (X2000). (Photograph courtesy of Heidi Moyer, Lehigh University)

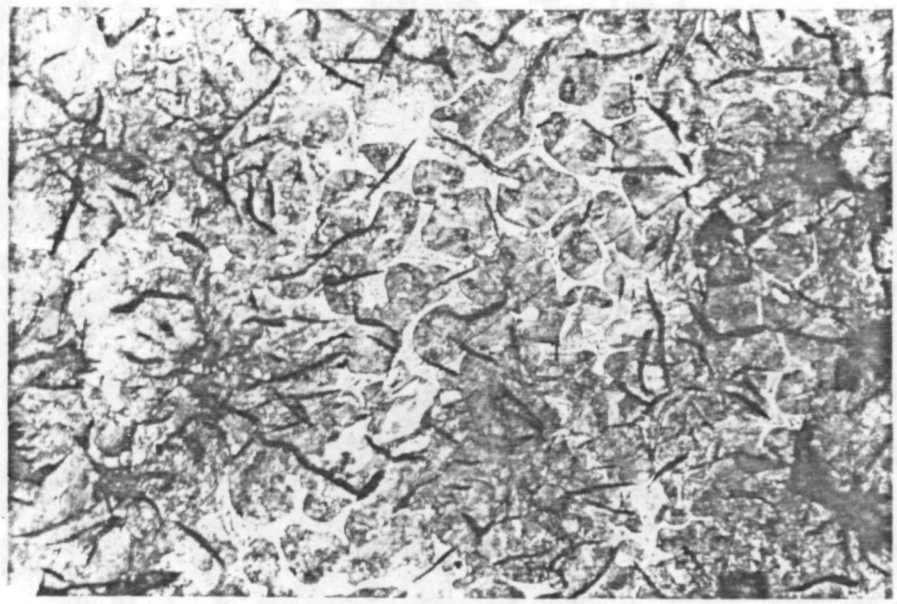


Plate 24: Micrograph of mottled cast iron (#3) etched with 2 percent nital, showing iron carbide (white) in matrix of pearlite (gray) and graphite nests (black) (X200). (Photograph courtesy of Nicholas Hartmann, MASCA)

APPENDIX I
Selected 1980 Figures

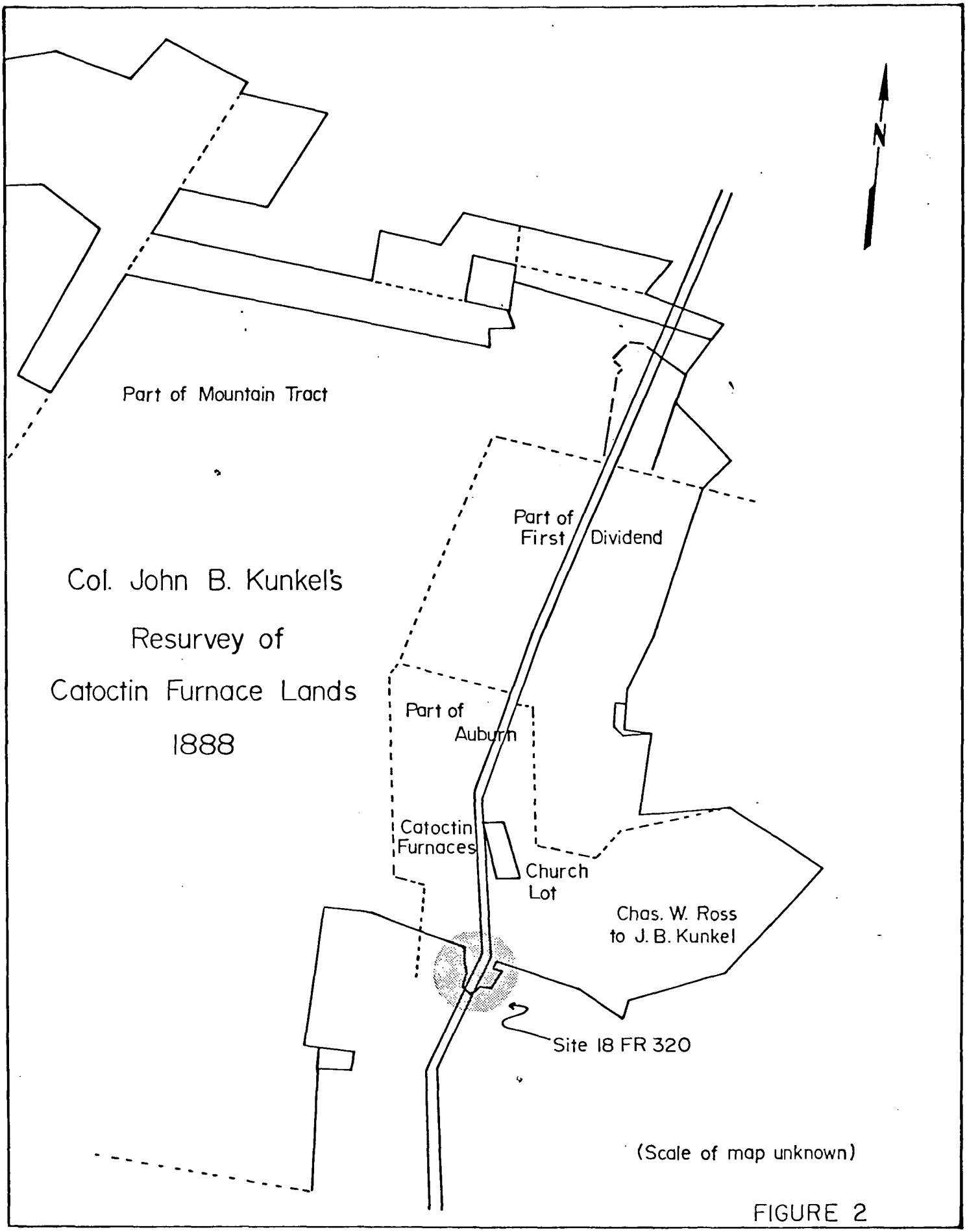
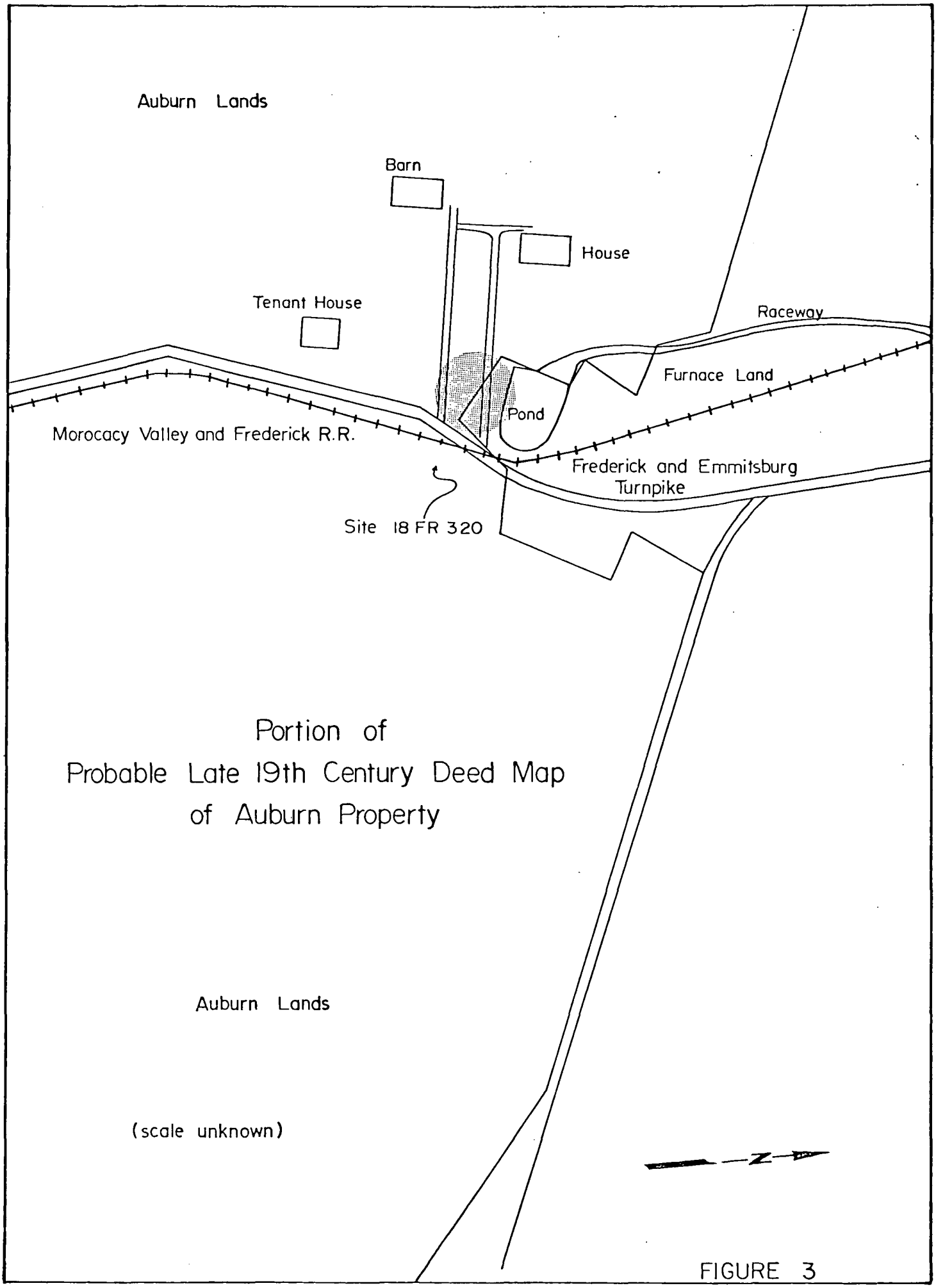

N
Part of Mountain Tract
Part of First Dividend
Col. John B. Kunkel's
Resurvey of
Catoctin Furnace Lands
1888
Part of Auburn
Catoctin Furnaces
Church Lot
Chas. W. Ross to J. B. Kunkel
Site 18 FR 320
(Scale of map unknown)

FIGURE 2



Portion of
Probable Late 19th Century Deed Map
of Auburn Property

FIGURE 3

TRENCH 3
PROFILE NORTHEAST FACE

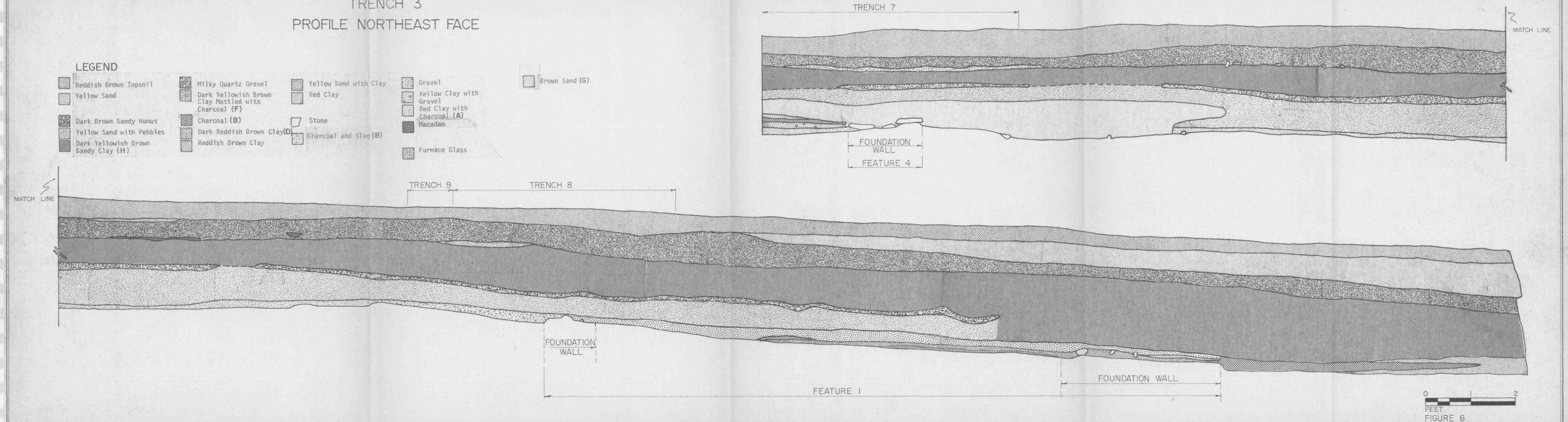
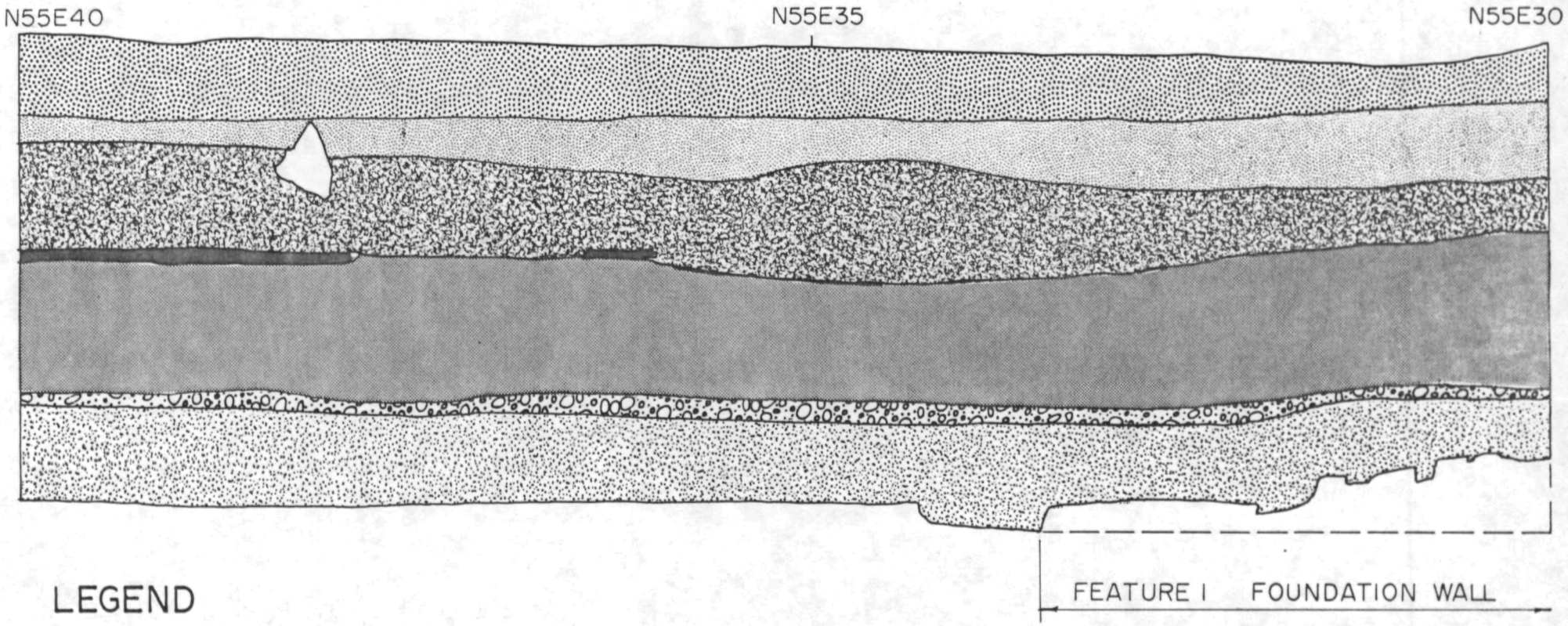


FIGURE 6

N55E30 - N55E35
PROFILE SOUTH FACE



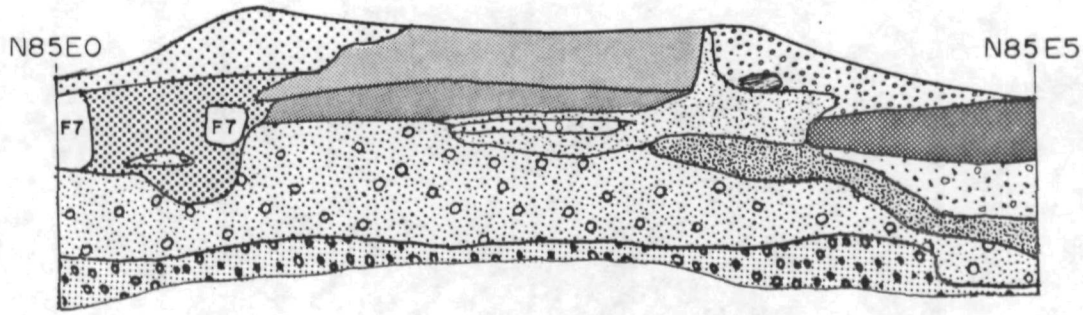
LEGEND

- Reddish Brown Topsoil
- Yellow Sand
- Dark Brown Sandy Humus
- Dark Yellowish Brown Sandy Clay (H)
- Milky Quartz Gravel
- Dark Yellowish Brown Clay Mottled with Charcoal (F)
- Stone
- Macadam

0 1 2
FEET

FIGURE 8

N80E0
PROFILE NORTH FACE



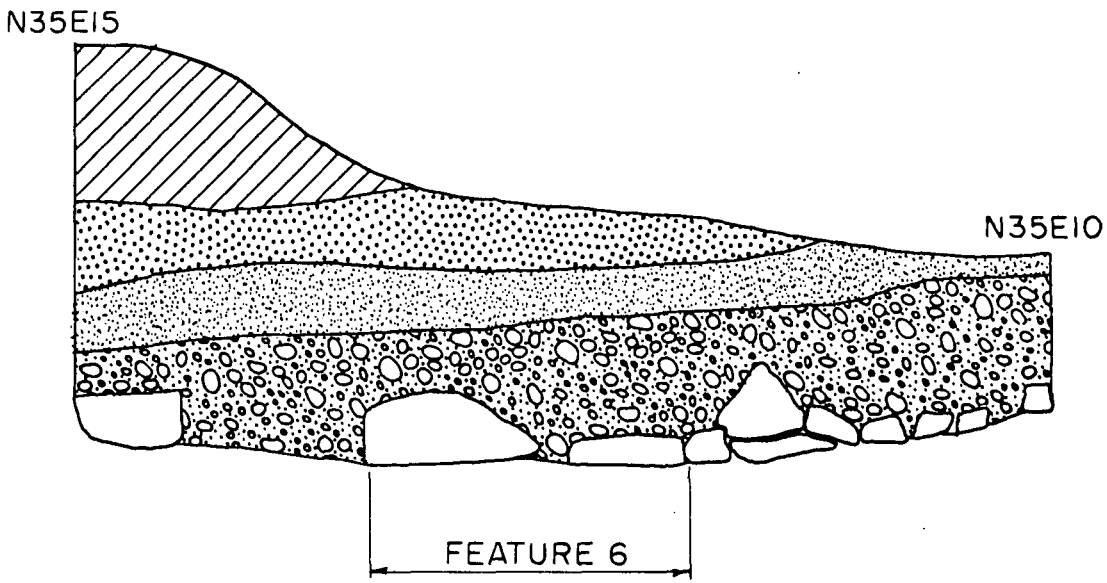
0 1 2
FEET

LEGEND

- Dark Yellowish Brown Sand
- Dark Yellowish Brown Medium-grained Sand
- Dark Brown Coarse-grained Sand
- Very Dark Greyish Brown Sand
- Dark Yellowish Brown Fine-grained Sand
- Dark Yellowish Brown Clay Mottled with Charcoal (F)
- Dark Reddish Brown Clay
- Dark Reddish Brown Clay with Charcoal
- Hard-packed Dark Yellowish Brown Mottled Clay (G)
- Brownish Yellow Shale
- Dark Brown Sand with Charcoal (E)
- Brown Sand with Charcoal (E)
- F7 Stones in Feature 7
- Root

FIGURE 9

N35E10
PROFILE SOUTH FACE



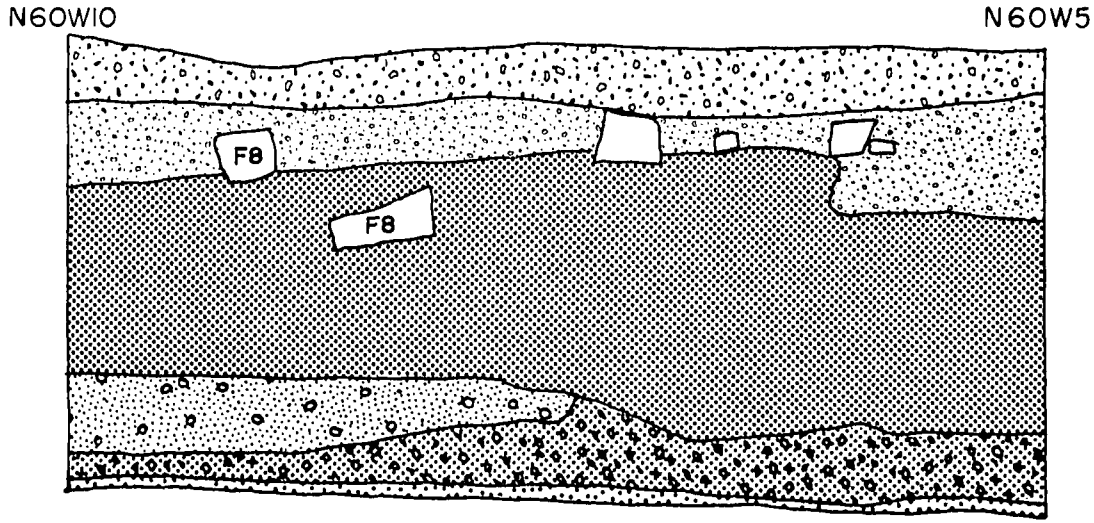
LEGEND

- Dark Brown Clay
- Dark Yellowish Brown Clay with Stone Rubble
- Dark Reddish Brown Clay with Gravel and Iron Waste
- Stone
- Disturbed

0 1 2
FEET

FIGURE 10

N60W10 SOUTH HALF
PROFILE NORTH FACE

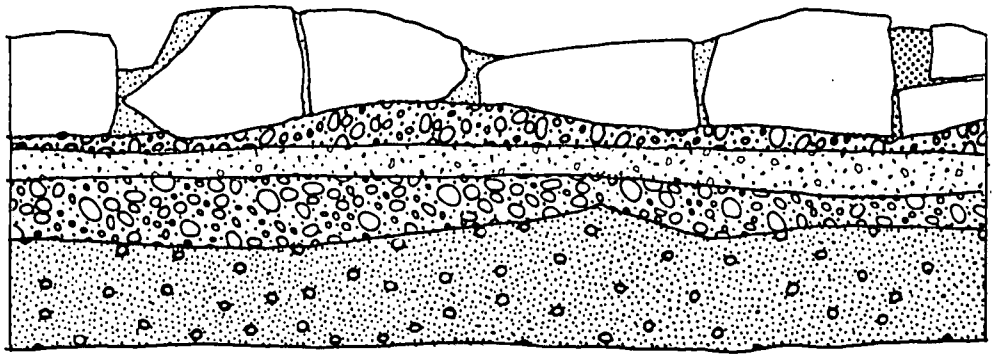


LEGEND

- Brown Sand With Brick Fragments and Charcoal
- Yellowish Brown Sandy Clay with Brick Fragments (F)
- Dark Brown Sand (E)
- Dark Reddish Brown Sand with Gravel (D)
- Dark Brown Sand With Charcoal and Slag (B)
- Dark Reddish Brown Clay (A)
- Stone
- F8 Stones in Feature 8

FIGURE 13

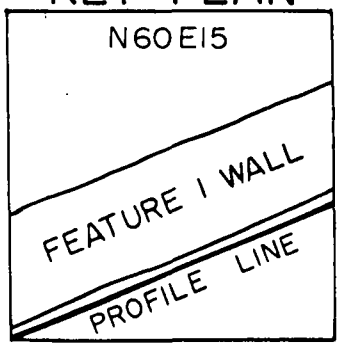
FEATURE I WALL
PROFILE INTERIOR FACE



LEGEND

- Yellow Sand with Clay
- Mortar
- Stone
- Dark Reddish Brown Clay and Slag
- Dark Red Clay with Shale and Slag
- Dark Red Clay with Charcoal

KEY PLAN



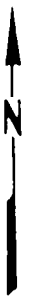
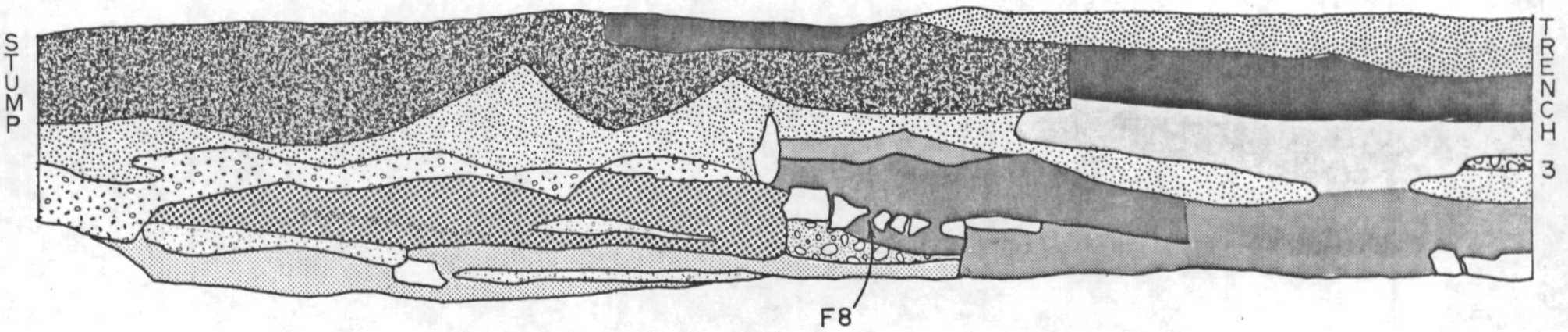


FIGURE 14

TRENCH 7, NORTHEAST OF TRENCH 3
PROFILE SOUTHEAST FACE

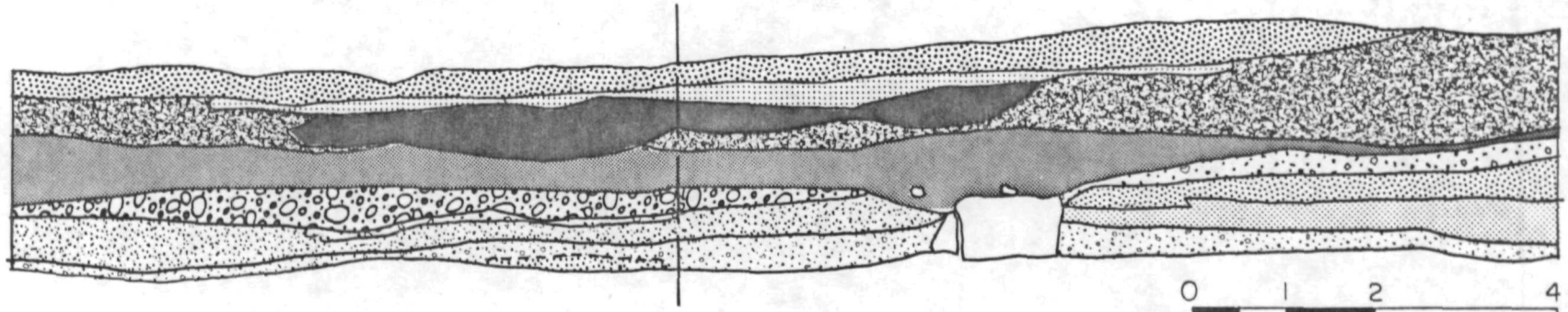


LEGEND

- Very Dark Grayish Brown Humus
- Macadam
- Reddish Brown Topsoil
- Yellowish Brown Mottled Clay (F)
- Brown Sand (E)
- Milky Quartz Gravel (A)
- Dark Reddish Brown Sandy Clay with Gravel (D)
- Charcoal (B)
- Brown Sandy Clay (E)
- Dark Red Sandy Clay with Brick Fragments
- Dark Red Clay (A)
- Charcoal Mottled with Red Sandy Clay
- Stone
- Dark Yellowish Brown Sandy Clay (H)

FIGURE 16

TRENCH 9
PROFILE WEST FACE



LEGEND

- Reddish Brown Topsoil
- Dark Brown Sandy Humus
- Yellowish Brown Clay
- Macadam
- Dark Yellowish Brown Sandy Clay (H)
- Milky Quartz Gravel
- Dark Yellowish Brown Clay Mottled with Charcoal (F)
- Dark Reddish Brown Sandy Clay with Gravel
- Charcoal and Slag (B)
- Reddish Brown Clay with Charcoal
- Brownish Yellow Clay
- Dark Red Clay
- Stone

KEY PLAN

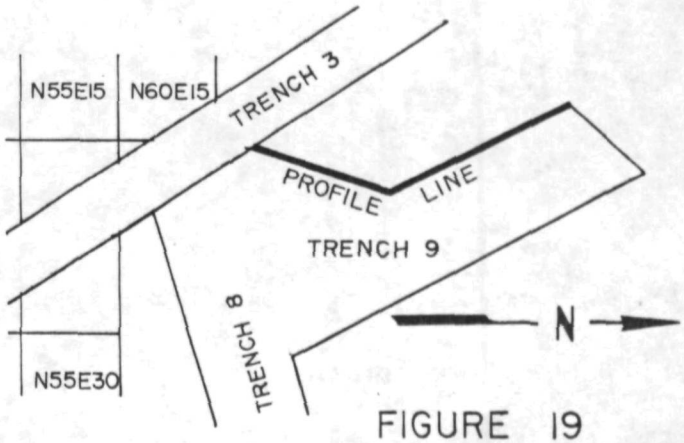


FIGURE 19

APPENDIX II
1979 Artifact Catalog

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin Furnace, 18FR320

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
1	Trench 1 (South half)	1 mortar sample from stone facing on dam	7/23/79	
2	Trench 2 (North half)	2 window glass 1 gray salt glaze stoneware 1 white salt glaze stoneware 1 square nail 2 amber bottle glass (recent)	7/23/79	
3	Trench 1 (West half) beneath top-soil	1 hollow ware fragment (iron) 1 waste iron 1 horse shoe 3 square nails 1 modern amber bottle glass	7/23/79	
4	Trench 3 layer 4	1 V-shaped hook fragment 2 square nails 1 1842 dime	7/24/79	
5	Trench 1	1 fragment amber bottle glass	7/24/79	
6	Trench 2	1 bargs soda bottle (recent) 1 porcelain door knob	7/24/79	
7	Trench 4	miscellaneous clear bottle glass (recent)	7/25/79	
8	Trench 3	1 refined white earthenware fragment 2 slag fragments 1 window glass fragment	7/25/79	
9	Trench 4 layer 6	1 square nail 1 amber bottle glass 1 railroad spike 3 clear plate glass	7/25/79	
10	Trench 3 feature 1	3 window glass 1 square nail	7/25/79	
11	Trench 4 backhoe	coke bottle	7/25/79	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin Furnace, 18FR320

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
12	Trench 3 layer 4	6 square nails 1 clear bottle glass	7/25/79	
13	Trench 3 layer 7	2 fragments window glass	7/25/79	
14	Trench 3 feature 1 layer 6	1 amorphous small lump of iron	7/25/79	
15	Trench 3 layer 6	1 iron strap fragment 1 modern bottle glass 2 redware 2 square nails	7/25/79	
16	Trench 2 layer 5	Iron spill or waste	7/23/79	
17	Trench 3 top of layer 7, East of feature 1	14 window glass	7/26/79	
18	Trench 3 East of feature 1, bottom of layer 7	2 square nails 2 refined white earthenware (1 blue edge) 1 redware 1 wrought iron spike-diagonal striking marks on opposite sides-6"x 3/4"x3/4"	7/26/79	
19	Trench 3 East of feature 1, layer 8	3 square nails	7/26/79	
20	Trench 3 feature 2	1 bone 3 slag 3 square nails 2 redware	7/26/79	
21	Trench 3 feature 1 south footing	8 window glass	7/27/79	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin Furnace, 18FR320

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
22	Trench 3 feature 1 north footing	3 square nails	7/27/79	
23	Trench 3 layer 7	2 slag 4 square nails 1 window glass 1 refined white earthenware	7/27/79	
24	Trench 3 north footing north of feature 1, layer 8	4 square nails	7/27/79	
25	Trench 4 layer 7	assorted slag 6 square nails 1 window glass	7/27/79	
26	N55E35/N55E30 layer 3	3 buff stoneware	7/27/79	
27	Trench 5 layer 7	2 unidentified iron fragments 6 square nails	7/27/79	
28	Trench 3 layer 7 north of feature 1	3 square nails	7/30/79	
29	Trench 3 west end layer 8	3 slag 1 refined white earthenware-green edge 1 green bottle glass 1 window glass	7/30/79	
30	Trench 5 north layer 7	4 slag	7/30/79	
31	N55E30/E35 layer 7	slag sample	7/30/79	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin Furnace, 18FR320

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
32	N55E30/N55E35 base of feature 5	1 redware	7/31/79	
33	N55E30-35 layer 7	55 window glass 1 iron hollow ware fragment 17 square nails 1 sickle-shaped piece of brass 1 chinese porcelain 2 refined white earthenware 1 amber bottle glass	7/31/79	
34	Trench 3 west end gravel and clay above red layer	1 small strip of lead 1 square nail 1 window glass 1 slag	7/31/79	
35	Trench 3 west end red layer above yellow	11 slag 1 square nail 1 slip decorated redware	7/31/79	
36	Trench 3 red and black layer, west of feature 4	7 slag 1 square nail 4 refined white earthenware (1 with green shell edge) 1 porcelain	8/1/79	
37	N55E25, feature 1 layer 6	4 waste iron 2 refined white earthenware (probably blue edge) 4 square nails	8/1/79	
38	Trench 4 test through slag deposit	1 square nail 1 slag	8/1/79	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catocitn Furnace, 18FR320

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
39	N55E30/N55E35	1 iron strap leg (possible)	8/1/79	
40	N55E30/N55E35	mortar sample	8/1/79	
41	N55E30/E35 feature 1 layer 7	1 iron hollow ware leg fragment 5 slag 8 square nails 1 redware 102 window glass	8/1/79	
42	Trench 3-west of feature 4 gravelly yellow layer	1 bone 1 slag 1 square nail 1 refined white earthenware	8/2/79	
43	Trench 3-west of feature 4	2 square nails	8/2/79	
44	N55E25, layer 6, above feature 1	5 square nails 1 fragment of iron strap	8/2/79	
45	Trench 4-south of feature 6	1 redware 2 charcoal 9 slag 2 square nails	8/2/79	
46	Trench 4 through slag floor	1 wood fragment 8 slag 18 square nails 1 possible hollow ware fragment (iron)	8/2/79	
47	Trench 4, north of feature 6 (slag layer)	2 large slag 1 square nail 3 large pieces of cast iron waste 1 tapered iron bar 5"xl"xl"	8/2/79	

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ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin Furnace, 18FR320

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
48	Trench 1, east end in hard packed reddish brown earth near foot of dam wall	1 large slab of iron spill or waste	8/2/79	
49	surface collected	slag samples	8/3/79	
50	Trench 3, 23' west of feature 4, yellow clay and gravel	1 iron strap fragment, 4x1x1/8 5 refined white earthenware (green edge) 1 salt glaze stoneware-gray 1 redware 5 green bottle glass 3 square nails	8/3/79	
51	Trench 3, west of feature 4 red/black layer	1 square nail 1 redware	8/3/79	
52	Trench 4, test pit in slag floor	11 slag 2 square nails 1 fragment of cast iron plate 1 strap or plate fragment of iron	8/3/79	
53	Trench 4, south of feature 6 below layer 7	5 slag 1 redware 1 gray salt-glazed stoneware 2 charcoal 1 waste iron	8/3/79	
54	N50E30, beneath gravel drive	1 1890 nickel	8/3/79	
55	Trench 4, feature 6 with stones under layer 7	large chunk of slag	8/6/79	

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Name of site: Catoctin Furnace, 18FR320

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56	Trench 3, west of feature 4 red/black layer	3 iron waste 1 redware 1 cast iron hollow ware leg (3")	8/6/79	
57	Trench 3 cleaning	3 slag 1 square nail	8/6/79	
58	Trench 4, layer 7, feature 6	1 iron plate fragment 3 square nails	8/6/79	
59	Trench 4, feature 6, top of layer 7	slag samples	8/6/79	
60	Trench 4 feature 6, with stones under layer 7	slag samples	8/6/79	
61	Trench 3, south end, red clay and shale layer 7	1 square nail	8/7/79	
62	Trench 3, south end of layer 6	5 square nails	8/7/79	
63	Trench 3, west of feature 4 red black layer	3 square nails 1 sprue fragment (possible) 1 waste iron 1 cast iron hollow ware handle fragment - 5"x1"	8/7/79	
64	Trench 3,west of feature 4 red/black layer	1 wedge gate 1 iron spike	8/7/79	

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
65	Trench 5 layer 7	pressed brick fragment	8/7/79	
65	Trench 5 layer 7	1 iron plate fragment 1 iron flat file fragment 1 slag 2 square nails	8/7/79	
66	Trench 5 layer 8	5 fragments of slag 2 square nails	8/7/79	
67	Trench 5 layer 7	6 waste iron 1 fragment of thin iron plate 1 Y-shaped iron bar 1 iron hook and holdfast 4 square nails	8/7/79	
68	Trench 3, west west of feature 4, red/black layer	1 iron waste or spill 1 slag 6 wedge gates	8/7/79	
69	Backhoe-north of west end of feature 4 (in area of large stump	1 cast iron pot with 3 legs and straight handle	8/7/79	
70	N50E35, layer 4, below feature 5	2 slag 1 square nail 4 refined white earthenware	8/7/79	
71	N50E35, layer 6	6 square nails 2 waste iron 1 thin strap fragment	8/7/79	
72	Trench 4, layer 7, just north-east of Orr's test pit	1 square nail 7 slag	8/8/79	

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73	Trench 4 feature 6 (west of wall amongst rubble)	2 slag (with impressions of brick lining)	8/8/79	
74	Trench 4 feature 6 (east of wall in rubble)	2 square nails	8/8/79	
75	Trench 4 feature 6 west of wall black ask and rubble	1 waste iron 9 slag 1 square nail	8/8/79	
76	Trench 4 cleaning feature 6	1 slag	8/8/79	
77	N50E25, surface of layer 6	2 waste iron	8/8/79	
78	N50E25, layer 4 (brown beneath gravel drive)	1 white porcelain 2 chinese porcelain 2 square nails 1 redware 1 clear bottle glass 1 refined white earhtneware	8/8/79	
79	Trench 3, west of feature 4, black and red layer	9 redware 1 gray salt-glazed stoneware 6 square nails 1 3/4" thick iron bar (2"long) 1 small cast iron hollow ware tripod leg	8/9/79	
80	N45E25	1 white porcelain	8/9/79	
81	N60E15 backhoe	1 iron spike	8/9/79	

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
82	N60E15, north wall, feature 1	mortar sample	8/9/79	
83	N60E15, layer 4	4 square nails 1 window glass 2 cast iron plate fragment 2 waste iron 1 narrow iron rod fragment	8/9/79	
84	N60E15 , layer 6	mortar sample	8/9/79	
84	N60E15, layer 6	13 square nails 3 window glass 2 refined white earthenware 1 green bottle glass 5 waste iron 9 slag	8/9/79	
85	N45E25, surface of layer 6	2 green bottle glass 1 gray salt-glazed stoneware 3 refined white earthenware	8/9/79	
86	N50E25, layer 6	7 window glass 6 slag 4 square nails 2 thin cast iron plate fragments	8/9/79	
87	Trench 3, west of feature 4 red/black layer	2 redware	8/10/79	
88	N45E25, top of layer 6	4 slag 7 square nails 6 redware 1 Chinese porcelain 5 refined white earthenware 1 window glass 1 clear bottle glass	8/10/79	

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
89	N45E25, top of layer 7	2 square nails 3 redware	8/10/79	
90	N50E20, yellow black mottled over layer 6	22 small fragments clear bottle glass 3 small fragments refined white earthenware 4 lumps slag 5 fragments limestone 1 square nail 4 fragments gray salt-glazed stoneware	8/10/79	
91	N50E15, layer 6	1 square nail	8/10/79	
92	N50E20, brown soil with cinders above layer 6	1 waste iron 4 slag 6 square nails 5 refined white earthenware 1 gray salt-glazed stoneware	8/10/79	
93	N50E20, reddish brown above rubble wall	mortar 1 amethyst bottle glass 4 square nails 1 small iron strap with hole 1x2x1/16	8/13/79	
94	N60E10, top of red layer	1 large iron plate fragment 1 hollow ware fragment 7 square nails 1 unidentified iron fragment 1 window glass assorted slag	8/13/79	
95	N45E25, layer 6	23 small fragments of window glass 5 small fragments ceramics (1 with blue print) 5 small fragments bottle glass 7 square nails 8 unidentified iron fragments	8/13/79	

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
96	Trench 3	3 unidentified iron fragments	8/14/79	
97	N45E25, layer 7	1 flat iron plate fragment with offset edge 3 iron waste fragments 1 iron band (rectangular) 3 lumps of slag	8/14/79	
98	N50E20	sand from wall and floor	8/14/79	
99	N55E10, yellow black mottled clay above layer 6	5 redware 5 refined white earthenware 1 Chinese porcelain 2 white porcelain 2 square nails 1 slag 1 clear bottle glass 1 1875 dime	8/14/79	
100	N55E20, reddish brown gravelly soil, layer 6?	1 slag 3 unidentified iron fragments 1 redware 1 clear bottle glass 2 gray salt-glazed stoneware 3 refined white earthenware	8/14/79	
101	N60E10, red layer (shale)	9 square nails 1 heavy bolt and nut 4 slag 3 amorphous lumps of iron 1 window glass	8/14/79	
102	N60E10, red layer (shale)	mortar sample from wall	8/14/79	
103	N60E10, red layer (shale)	mortar sample	8/14/79	
104	N55E10	1 clear bottle glass (modern)	8/15/79	

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
105	N55E20, layer 6	3 square nails 3 Chinese porcelain (blue on white) 5 refined white earthenware 1 window glass 5 unidentified iron fragments 1 hollow ware iron fragments 2 fragments of iron plate 3/8" thick	8/15/79	
106	N50E20, reddish/brown gravelly deposit above sand floor	2 waste 4 square nails 2 redware 1 amber bottle glass 1 clear bottle glass 1 pipestem	8/15/79	
107	N55E20, top of sand floor	1 square nail	8/15/79	
108	N60E10, red layer (shale)	2 waste iron 1 fragment of iron plate 6 square nails	8/15/79	
109	N60E10, red layer (shale)	slag sample	8/15/79	
110	N30E15, humic clay under cobbles	1 probably steel file 1 unidentified iron artifact	8/16/79	
111	N55E10, dark brown fill with hard yellow clay	1 slag 2 shell 2 bottle glass (recent) 1 redware	8/16/79	
112	N55E10, light brown sand under dark brown	3 square nails 4 waste iron	8/16/79	

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113	N55E15, yellow black mottled soil	1 pipestem 1 Chinese porcelain	8/16/79	
114	N55E15, top layer-dark brown	2 porcelain 3 refined white earthenware 1 square nail	8/16/79	
115	N55E20, sand floor	1 slag 1 redware 1 square nail mortar	8/16/79	
116	N80E5, mottled deposit under layer 4, over wall of feature 4	3 redware 1 square nail 1 refined white earthenware (blue edge) 3 white porcelain 3 clear bottle glass 7 window glass	8/16/79	
117	N30E15, iron waste and charcoal under cobbles	2 square nails 2 unidentified iron fragments 13 slag fragments	8/17/79	
118	N30E15, sprue in iron slag on stone wall	1 wedge gate	8/17/79	
119	N55E5, light brown layer under dark brown	1 square nail	8/17/79	
120	N55E5, dark brown layer	6 amber bottle glass 1 red plastic tail light fragment 1 Chinese porcelain 2 refined white earthenware 1 square nail 3 clear bottle glass 1 waste iron	8/17/79	

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121	N55E10, light brown soil and red shale	1 square nail 1 waste iron	8/17/79	
122	N55E10 wall/ mortar	3 iron strap fragments 3 unidentified iron fragments 6 square nail fragments	8/17/79	
123	N55E10, sand floor	1 small fragment bottle glass	8/17/79	
124	N55E10	mortar sample from wall	8/17/79	
125	N55E15, red clay	4 unidentified iron fragments 5 square nails 2 lumps of slag	8/17/79	
126	N55E15, brick, mortar, rubble	1 square nail	8/17/79	
127	N80E5, above feature 4 wall in yellow-brown soil	1 wedge gate 1 unglazed china 6 redware 2 salt-glazed stoneware 6 amber bottle glass (comparatively thick) 4 square nails 1 possible strap hinge fragment	8/17/79	
127	N80E5	1 wrought iron wedge or chisel, 3 1/2x2"		
128	N80E5, above feature 4 wall	slag/ ore sample	8/17/79	
129	N30E15, feature 6, iron waste layer above wall	1 cast iron hollow ware leg fragment 1 slag 2 furnace glass 2 square nails 1 cast iron hollow ware fragment 1 window glass 1 clear bottle glass	8/20/79	

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129	N30E15, feature 6	1 square nail 4" 1 pintle hinge receptacle 4 1/2"	8/20/79	
130	N50E10, brown layer 2" below surface	charcoal fragments	8/20/79	
131	N50E10, yellow mottled clay	1 small fragment green bottle glass	8/20/79	
132	N50E10, red layer under yellow mottled clay	1 redware 1 square nail 5 refined white earthenware (1blue edge)	8/20/79 8/20/79	
133	N55E5, dark brown layer	7 square nails 3 slag 13 window glass 1 brass cartridge case (approximately 30 caliber)	8/20/79	
134	N55E15, under rubble, above sand	1 redware fragment, clear glaze interior 2 mortar samples (heavy lime content) 2 cut or wrought nails 2 windows glass fragments (thin) 1 cast iron fragment	8/20/79	
135	N55E15, under sand floor	1 small cast iron plate fragment	8/20/79	
136	N45E15, yellow mottled clay	1 clear bottle glass 1 square nail 1 refined white earthenware 2 window glass	8/23/79	
137	N45E15, red layer under yellow mottled clay	18 small fragments of window glass 3 square nails 1 slag fragment 2 redware fragments 1 gray salt-glazed stoneware 8 refined white earthenware fragments	8/23/79	

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138	N50E10, dark brown fill to mottled yellow soil	2 fragments bottle glass (recent)	8/23/79	
139	N50E5, yellow mottled soil	1 amber bottle glass fragment (modern)	8/23/79	
140	N55E5, within wall structure	thin metal sheathing or flashing	8/23/79	
141	N60E10, yellow mottled clay	1 square nail	8/23/79	
141	N60E5, yellow mottled soil to floor of wall	21 square nails 2 bail fragments 1 iron plate fragment 1 iron spike assorted slag 1 milkglass button 1 redware 1 refined white earthenware 3 window glass 3 amber bottle glass	8/23/79	
142	N60E5	1 square nail fragment	8/23/79	
143	N80E0, clay and sand above feature 4	2 slag 1 window glass 1 yellow ware 1 Chinese porcelain 1 Rockingham 1 clear bottle glass("whittle marked")	8/23/79	
144	N45E15, yellow mottled clay	1 clear bottle glass	8/23/79	
145	N50E15, layer 6 reddish gravel	1 refined white earthenware 1 Chinese porcelain 2 window glass 1 redware 1 square nail 1 furnace glass 1 slag	8/22/79	

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
146	N50E15, sand and mortar	2 slag fragments 9 square nails 1 possible chain link	8/22/79	
147	N55E5, clean up	1 slag 1 square nail 6 window glass	8/22/79	
148	N60E5, shoveled to yellow mottled soil	1 slag 1 mason jar fragment	8/22/79	
150	N80E0, hard red and yellow clay with brown sand above, feature 4	2 window glass 2 square nails 2 refined white earthenware 2 green bottle glass	8/22/79	
151	overburden between pillars	1 Chinese porcelain 1 refined white earthenware 3 square nails	8/24/79	
152	N45E15, south of feature 1	9 slag 1 V-shaped iron rod 1 unidentified iron fragment 27 square nails 15 window glass	8/27/79	
153	N45E15, sand floor	1 slag 4 square nails 3 window glass	8/27/79	
154	N45E15, cleaning sand floor	2 square nails 3 window glass	8/27/79	

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155	N50E10, red layer below yellow mottled soil	4 amber bottle glass 5 square nails 3 unidentified iron pieces 40 window glass	8/27/79	
156	N50E10, yellow brown mottled soil	assorted fragments modern beer bottle 1 square nail 5 window glass 1 green bottle glass	8/27/79	
157	N50E10, black charcoal, north side of wall	1 horseshoe fragment 1 nail fragment	8/27/79	
158	N50E10, feature wall in bottom of mottled yellow layer	1 iron strap 1/4" thick, 6" long, 1 1/2" wide broken on each end	8/27/79	
159	N45E15, red sandy soil south of wall	2 square nails	8/28/79	
160	N45E20, black charcoal and ash	4 square nails 17 window glass 1 refined white earthenware 1 bolt fragment 4 slag fragments	8/28/79	
161	N45E20, black charcoal layer below red	1 long (10") thin (1/4") iron rod 5 slag 10 square nails 60 window glass 1 stoneware	8/28/79	
162	N50E10, yellow mottled clay	1 iron bar fragment (square X-section) 1 threaded iron bolt	8/28/79	

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
163	N60E15, sand floor	1 large iron fragment 1 redware fragment, brown glaze interior 3 cut nails 2 limestone fragments	8/28/79	
164	N60E15, slag below sand floor	2 square nails	8/28/79	
165	N60E20, sand floor	thin iron strap 3 cut nails 1 strap pierced by cut nail 1 possible cold chisel fragment 1 1/4"x4"	8/28/79	
166	N80E0, layer 7	3 slag 2 waste iron 1 square nail 1 window glass	8/28/79	
167	backhoe dirt	1 narrow wedge gate	8/28/79	
168	Trench 7, top of feature 4 wall under red clay and charcoal	2 slag	8/29/79	
169	South wall of balk	1 square nail 1 ceramic tile (recent) 1 bottle glass (recent)	8/29/79	
170	N60E15, slag below sand floor	6 slag 1 square nail	8/29/79	
171	N60E15, red clay under slag	4 square nails	8/29/79	
172	N60E15, red clay under slag	4 lumps of slag	8/29/79	
173	N60E20, sand floor	5 square nails 2 slag	8/29/79	

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
174	N65E0, shoveled to red layer just below 3" slag deposit	1 iron bar or spike fragment 1 long iron spike 1 square nail 1 refined white earthenware 1 redware	8/29/79	
175	N65E0	slag sample	8/29/79	
176	N80E0, brown sand and gravel	4 square nails 2 bottle glass 1 china 4 unidentified metal fragments	8/29/79	
177	N80E0, yellow clay with gravel	2 gray salt-glazed stoneware 2 refined white stoneware 2 window glass	8/29/79	
178	N80E0, red and black gravel	2 refined white earthenware	8/29/79	
179	N65E0, scraping walls	1 slag 2 window glass 1 wrought iron hook with eye, 5 1/4" long	8/30/79	
180	N75E0, brown sand fill inside feature 8	large slag samples	8/30/79	
181	N60E15, red clay	1 small fragment of iron rod	8/30/79	
182	N60W10, south half, yellow sandy clay	1 amber bottle glass	8/30/79	
183	N65E0, cleaning of feature wall	1 square nail	8/30/79	
184	N70E0, light brown fill inside and on raceway walls	2 square nails 1 thin iron strap 5x1 1/2x1/6	8/30/79	

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
185	N80E0, dark brown sand and gravel above charcoal	1 refined white earthenware 1 pipestem fragment 1 green bottle 2 square nails	8/30/79	
186	N60W10, south half, brown under yellow sandy clay	modern bottle glass (clear) rubber strip with metal hooks	8/30/79	
187	Trench 7, brown sandy fill over feature 4	large cast iron bar, 22" long x 2 1/4" wide x 1 3/4" deep	8/31/79	
188	floor of feature 1	iron shovel-like implement with holes	8/31/79	
189	N75E5, gray sandy fill above wall	4 large square nails 1 refined white earthenware 1 large possible wrought iron cold chisel fragment, 1 3/4 x 4 1/4"	8/31/79	
190	West stone pillar-brown sandy fill	1 horse shoe 1 mule shoe 1 horse shoe fragment 2 unidentified rubber and metal objects	8/31/79	
191	Trench 7, north of feature 4 wall	1 large chunk of waste iron	9/3/79	
192	N60W10, south half, above red clay	3 slag	9/3/79	
193	N75E10, red black mottled with shale	2 square nails	9/3/79	

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
194	N75E10, light brown mottled soil with pebbles	2 square nails 1 waste iron 3 white porcelain 1 refined white earthenware	9/3/79	
195	Trench 7, (west of elm)	1 large wedge gate 1 unidentified iron fragment	9/4/79	
196	Trench 7, above wall east of elm tree	1 narrow wedge gate 2 lumps of slag 1 cast iron hollow ware leg 2 1/2"	9/4/79	
197	N55E10, brown fill to yellow mottled soil	1 broken modern beer bottle 1 fragment rubber 1 unidentified metal fragment	9/4/79	
198	N50E10, yellow mottled soil on top of feature wall	3 square nails 2 clear bottle glass 2 amber bottle glass 9 window glass	9/4/79	
199	N75E0, brown sand	1 iron plate fragment 1/2" thick 1 square nails	9/4/79	
200	Trench 7, brown sandy fill over feature 4 wall	1 wedge gate (no puddling) 2 iron fragments-possible waste 1 iron conical sprue 3 1/2"	8/31/79	
201	N55E15, reddish brown clay at sand floor	3' wrought iron bar with shaped ends	8/20/79	
202	N60E15, slag below sand	sample of large chunks of slag	8/29/79	

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
203	Trench 8 and 9 brown sand or black charcoal and slag	7 slag 1 bone 1 large iron spike or bolt fragment, 8"x1 1/2x1 1/2, with square head 1 cast iron plate fragment, 1/2" thick 1 cast iron hollow ware leg 4" long (largest in collection)	9/7/79	
204	Trench 6B, clean up to black cinder layer	2 iron hollow ware fragments assorted iron waste and spill 1 wedge gate 5" long 3" deep	9/10/79	
205	Trench 7, red clay with charcoal west of elm at feature 4 corner	1 cast iron rod fragment 6" long 1" diameter 1 unidentified iron fragment	9/10/79	
205	Trench 7, west of stump	1 wedge gate 1 sprue 3 lumps of waste iron 2 square nails	9/10/79	
206	Trench 8, brown sand at corner of feature 1, at level of wall	1 reconstructable pipe bowl and stem	9/10/79	
207	Trench 8, sandy brown clay	1 unidentified cast iron fragment	9/10/79	
208	Trench 8, feature 1	1 cast iron fragment 3 square nails	9/10/79	
209	Trench 8, slag	1 iron bar 1 large piece of slag	9/10/79	

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210	Trench 9, cinder/charcoal layer	1 wedge gate 1 wedge gate fragment 1 charcoal slag sample 1 small wedge gate 1 sprue or riser (no flaring at top)	9/10/79	
211	Trench 9, slag floor	1 square nail 1 fragment of cast iron plate 1/2" thick 2 slag	9/10/79	
212	Trench 9, iron waste	9 large slag 1 conical sprue	9/10/79	
213	Trench 9, dark brown fill	iron rind and V-shaped strap	9/10/79	
214	Trench 6B, black layer under yellow fill	numerous fragments of modern beer bottles 5 slag 1 square nail 1 refined white earthenware with annular stripes 1 refined white earthenware	9/11/79	
215	Trench 6B black layer	1 iron bar fragment	9/11/79	
216	N35E20, yellow mottled clay	1 iron bar fragment, round (possibly riser)	9/11/79	
217	N35E15, reddish brown sandy soil with gravel	1 heavy iron spike 1 long narrow spike 1 slag	9/11/79	
218	Trench 6B, black charcoal floor-south side	8 miscellaneous iron fragments (probably waste or spill 1 large iron fragment with furnace glass	9/12/79	

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County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
219	Trench 7, brown clay	1 pot or kettle fragment-cast iron (no seam marks)	9/12/79	
220	Trench 6B, black charcoal floor-south side	1 wedge gate (no flaring or puddling)	9/13/79	
221	Trench 6B, south side, dark brown fill on top of black	1 large (10") iron waste fragment 1 large (12") iron waste fragment, some furnace glass adhering	9/13/79	
222	Trench 7, feature 9, east of elm	1 large slag fragment	9/13/79	
223	Trench 8 , feature 1 while clean-ing for plan	1 square nail 1 window glass	9/13/79	
224	Trench 9 (west face)	1 narrow iron strap, 1"x15"x1/4" 1 rectangular cast iron fragment 3 1/2"x 5"x1/2" 1 possible cold chisel fragment 1"wide x 3 1/2" long	9/13/79	
225	N50E20, above sandy red floor	2 large chunks of waste iron or slag	9/13/79	
226	N55E5, north-west, feature 1	1 iron strap fragment	9/13/79	
227	N55E20, sand floor	long iron spike	9/13/79	
228	N60E10, shale and slag	1 wood fragment 2 unidentified iron fragments 1 square nail	9/13/79	
229	N75E10, top of tree root	2 square nails	9/13/79	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin Furnace, 18FR320

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
230	N80E0, brown yellow clay	1 wedge gate (no flaring at top-possible riser)	9/13/79	
231	N110W10, top of rubble	1 fire brick fragment, labeled 1 cast hollow ware fragment-2 seams on exterior, (1 vertical-1 horizontal	9/13/79	
232	Trench 7, feature 9 (north corner)	large chunk of iron spill or heavy slag	9/13/79	
233	N110W5, east half, charcoal fill	1 unidentified fragment or iron 1 square nail 1 window glass	9/8/79	
234	Trench 4, west of feature 4	slag sample, large chunks	8/7/79	
235	Trench 9, (at east pillar) red clay	2 wedge gates	9/7/79	
236	Trench 7, north of feature 9 wall	2 wedge gates (1 large, 1 small) large gate is definitely concave at base	9/3/79	
237	Trench 3, west of test pit red layer above yellow gravel	1 white porcelain 1 iron strap or plate fragment 1 refined white earthenware	8/3/79	
238	Trench 6, brown sand 20' north west of north wall	1 fork-like iron tool, 6" long	8/3/79	

APPENDIX III
1981 Artifact Catalog

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
1	N50E5, clay on top of slag	1 salt-glazed stoneware sherd	4/29/81	
	Slag layer	1 6-1/2" x 3-1/2" x 5/8" fireback fragment 1 metal corner fragment 1 metal spike 3 whole nails 1 nail fragment 1 waste iron fragment 1 unidentifiable metal object 59 fragments of green-tinted window glass	4/29/81	
	Compact slag layer	2 pieces of sheet iron 2 metal straps fused together-hinge 2 flat metal fragments 1 whole cut nail 12 whole nails 2 nail fragments 1 waste iron fragment-slag 2 unidentifiable metal objects 1 earthenware sherd--white body and plain glaze	4/30/81	
	Compact slag layer	1 flat metal fragment 1 possible tip of spike 1 piece of wire	5/1/81 5/4/81	
2	N30 trench, dark grayish-brown clay with flecks	2 thin, cylindrical metal fragments 1 flat metal fragment--9/16" thick 1 large unidentifiable metal object--3-3/4" x 3-1/2" x 1 7/16"--has one flat surface 1 flat metal fragment--has twist at one end 1 whole cut spike 2 whole cut nails 1 redware sherd-dark glaze	4/22/81	
	N30 trench, slag layer with compacted thick lenses of charcoal	6 pieces of sheet iron 1 draw-knife--9-1/2" in length; wrought iron; has makers name "AMES" stamped on it and a touch mark 2 wedges--one is 3-3/4" in length, the other is 4-1/4" in length 3 pot fragments 1 metal strap--has hook at one end 1 possible section of pig iron--possible waste iron 1 piece of sheet iron--has one edge bent over 1 cylindrical metal fragment 1 U-shaped cylindrical metal fragment--possible tack or link	4/23/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
2	N30 trench, slag layer with compacted thick lenses of charcoal	2 cut spikes; both tips are missing 2 larger spikes; both tips are missing 2 spike fragments 2 spike tips 15 whole cut nails, assorted sizes 1 nail fragment 2 waste iron fragments; one is frothy slag, other is "drip" 4 wood samples	4/23/81	
	Reddish-brown sand with patches of charcoal	1 large flat metal fragment--6-1/2" x 3-3/4" x 1/4" 1 frothy slag sample, 14" in length	4/29/81	
3	N90W10, yellow clay over dark gravel to southwest of driveway	1 metal strap--8-3/4" in length; wrought iron	5/26/81	
	Yellow clay and mixed hard gravelly clay	1 metal ring--outside diameter is 2-1/4"--inside diameter is 1-1/2" 1 piece of sheet iron 2 wrought iron nail fragments 2 bone fragments--one is 3" in length, the other 1-1/4" in length 9 white porcelain sherds--2 bases, 1 rim, thick with a clear glaze 4 white porcelain sherds--"chinese export" 4 white earthenware sherds--clear glaze--blue and gray stripes and squares 1 white earthenware sherd--cobalt blue transferware--clear glaze 1 white earthenware sherd--purple decoration--clear glaze 1 white earthenware sherd--molded--cobalt blue decoration--possible handle 4 white earthenware sherds--clear glaze--no decoration 12 white earthenware sherds--thick--clear glaze--no decoration--3 rims, 4 bases 3 red earthenware sherds--brown glaze 2 red earthenware sherds--dark glaze--1 rim 5 red earthenware sherds--light brown speckled glaze (lead) 13 red earthenware sherds--no glaze--1 rim 13 fragments of green-tinted window glass	5/26/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
3	Yellow clay and mixed hard gravelly clay	4 fragments of clear window glass 2 fragments of white glass button	5/26/81	
	Charcoal mixed with red shale	3 flat metal fragments 1 curved metal fragment 1 whole spike 2 nail fragments	5/28/81	
	Yellow clay with gravel	2 white earthenware sherds--green shell edged--2 rims 7 white earthenware sherds--clear glaze--no decoration 1 red earthenware sherd--brown glaze 1 fragment of clear window glass	5/28/81	
	Purple clay	1 white earthenware sherd--clear glaze--green decoration	5/29/81	
	Interface of dark brown gravelly clay at purple clay	1 wedge gate	5/29/81	
	Slag level	1 slag sample	5/29/81	
	"Purple" (hard packed red shale)	1 wedge gate Possible iron runners 1 unidentifiable metal fragment	6/1/81	
	Surface of red clay with some shale	1 flat metal fragment 1 whole nail	6/1/81	
4	N30E5, topsoil and mixed layer	1 iron vessel fragment 1 stoneware sherd--black glaze on one side--clear glaze on the other	4/30/81	
	Brown loam	1 piece of twisted wire 2 wood samples--painted green	4/30/81	
	Slag in clay	8 small slag samples	4/30/81	
	Slag in clay	2 flat metal fragments 1 curved metal fragment 2 unidentifiable metal objects 1 piece of sheet iron 3 nail fragments 12 small slag samples	5/1/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
4	"Hammerscale"	1 "hammerscale" sample	5/4/81	
	Red slag	1 wedge gate 1 iron bar--7" in length 1 piece of sheet iron 2 flat metal fragments 2 whole nails 1 nail fragment 1 spike fragment 1 waste iron fragment 1 unidentifiable metal object	5/4/81	
	Slag	1 slag sample	5/4/81	
	Surface of sandy clay	1 white earthenware sherd--clear glaze over blue transfer 1 white earthenware sherd--clear glaze--no decoration--base		
	Pink clay above charcoal below slag	2 nail fragments 1 spike fragments	5/4/81	
	Charcoal and slag beneath pinkish clay and shale	2 flat metal fragments 1 nail fragment 3 small slag samples 1 red earthenware sherd--brown glaze(matte)	5/5/81	
	Charcoal and slag above sandy clay	1 slag sample	5/5/81	
5	N40E15, charcoal and slag	1 wrought iron bar--4-3/4" in length 1 wrought iron rod--one end split--other end appears to have been cut or pinched when hot--6-3/4" in length 2 wrought iron rods 2 flat metal fragments 1 metal rim fragment 16 whole nails 23 nail fragments 1 waste iron fragment 2 pieces of furnace glass 13 fragments of green-tinted window glass 1 white earthenware sherd--clear glaze--no decoration 1 red earthenware sherd--dark glaze (lead)	4/27/81	
	Slag	5 whole nails 6 nail fragments 1 small slag sample	4/28/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
5	Slag	4 fragments of green-tinted window glass 1 wood sample	4/28/81	
	Compact slag and charcoal	1 metal bolt with a four-sided nut attached to it--both bolt and nut are wrought iron --bolt is 4" in length, nut is 1-3/4" square 1 piece of sheet iron 1 nail fragment	4/28/81	
	Slag	1 nail fragment 1 white earthenware sherd--clear glaze--no decoration 2 fragments of green-tinted window glass	4/28/81	
	Slag	5 whole nails 2 nail fragments 3 waste iron fragments	5/5/81	
	Slag	1 slag sample	5/5/81	
	Silty clay in race	1 possible bearing block-conserved 2 nail fragments 2 red earthenware sherds--one has brown glaze other has clear glaze--both are rims	5/8/81	
	Clay and gravel fill in race	1 nail fragment 2 pieces of furnace glass 1 wood sample--wood has been cut at both ends--3-3/4" in length	5/11/81	
6	N30E25, loose dark brown gravel	1 two-sided wrench (heads at each end), 5-1/4" in length 1 possible pig bone--humerus--5" in length	5/14/81	
	"hammerscale" clay	1 whole cut nail 1 nail fragment 1 whole spike 1 spike fragment	5/17/81	
	Slag layer to mottled clay	1 earred lug from vessel 1 iron bar--3-1/2" in length--bar is 1-1/2" square 4 flat metal fragments 1 broken horseshoe--one half remaining 2 nail fragments 2 waste iron fragments 4 wood samples--2 samples have been cut at one end--3 samples have been charred	5/18/81 5/19/81 5/20/81	

ARCHEOLOGICAL SPECIMEN CATALOG

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Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
6	Heavy slag	1 fragment of pig iron 1 sample of cylindrical slag	5/21/81	
	Hard gray clay--fill of race	2 whole nails 6 nail fragments 1 waste iron fragment 2 fragments of green-tinted window glass	5/26/81	
7	N90E0, drive-way layer	1 metal hinge part--possible gate piece--7" in length 2 whole nails 2 waste iron fragments 16 white earthenware sherds--clear glaze--no decoration 1 white earthenware sherd--clear glaze--blue transfer 2 white earthenware sherds--clear glaze--both sherds are refined 1 buff earthenware sherd--brown glaze with black speckles 5 red earthenware sherds--clear glaze--slip design 1 red earthenware sherd--clear glaze--no decoration (lead glaze) 5 red earthenware sherds--clear glaze--two sherds have grooves on unglazed side 2 red earthenware sherds--clear glaze with brown speckles 3 red earthenware sherds--brown glaze--1 rim 4 red earthenware sherds--dull dark glaze 2 white porcelain sherds--clear glaze--blue transfer 15 white porcelain sherds--"chinese export" 5 rims, 1 base 1 salt-glazed ironstone sherd 7 fragments of clear window glass 8 fragments of green-tinted window glass 1 fragment of green bottle glass 4 fragments of animal bone 1 possible bakelite comb		
	Charcoal over red shale	1 wedge--5-3/4" in length 1 broken sprue 2 nail fragments 1 piece of furnace glass 1 firebrick--writing on brick--"BER...PRE...FIRE..."--5" in length	5/27/81	
	Hard-packed red shale	2 wedges--one is 4" in length, other is 4-1/4" in length 1 flat metal fragment	5/28/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
8	N50E25, charcoal spread above mortar and red shale	2 possible hinge straps--both are wrought iron 2 flat metal fragments 3 nail fragments	6/3/81	
	Mortar spread outside of Feature 1 to south wall	1 wrought iron object--square hole at one end--19-1/2" in length--slightly curved, skein from tar skein axle	6/3/81	
	Feature 41	3 pieces of sheet iron 1 whole nail 3 nail fragments 4 fragments of green-tinted window glass 3 fragments of clear window glass	6/11/81	
	Feature 41	1 piece of sheet iron 10 whole nails 7 nail fragments 1 spike fragment 52 fragments of green-tinted window glass 32 fragments of clear window glass 2 fragments of clear bottle glass	6/11/81	
	Charcoal above clayey mortar--south of Feature 1	2 nail fragments	6/11/81	
	Mortar or yellow clay under rocks--south of Feature 1	1 possible metal "pot stand"--"leg" is wrought iron--"body" is cast iron--leg and body are held together by 3 rivets 13 pieces of sheet iron 8 nail fragments 1 unidentifiable metal object--wrought iron 175 fragments of green-tinted window glass 35 fragments of clear window glass	6/11/81	
	Mortar layer on top of Feature 1	2 flat metal fragments 3 whole nails 5 nail fragments 152 fragments of green-tinted window glass 1 fragment of green-tinted bottle glass 49 fragments of clear window glass	6/11/81	
	Top of southeast corner of Feature 1	1 piece of copper sheeting--5" x 3"	6/12/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
8	Loose mixed slag	2 possible metal bowl fragments 2 whole nails 2 nail fragments	6/12/81	
	Red shale outside of Feature 1	2 whole nails 1 nail fragment 1 spike fragment 1 waste iron fragment 1 fragment of clear window glass	6/12/81	
	Feature 41	1 wedge--4" in length 1 whole nail 5 nail fragments 12 fragments of green-tinted window glass 1 fragment of green-tinted bottle glass--partial neck and rim 2 fragments of clear window glass	6/12/81	
	Silty clay in race	1 large spike--18-1/2" in length--wrought iron--4 sided--rounded on top	6/19/81	
9	N40E45, red shale around rocks over mortar	1 possible metal bowl fragment 5 flat metal fragments 1 possible metal handle or chain link 1 metal leg fragment 2 waste iron fragments 4 whole nails 5 nail fragments 1 spike fragment--tip	5/28/81	
	Mortar layer under red shale	1 nail fragment 1 spike fragment--wrought iron	5/28/81	
	Brown gravel over red shale	1 nail fragment 2 white earthenware sherds--both have clear glaze--one blue-shell edge--other has no decoration	6/3/81	
	Mixed brown soil over mortar	1 wedge--5-1/4" in length 1 cast iron stove door latch 1 metal "ring" 1 unidentifiable angular metal object 3 flat metal fragments 1 piece of sheet iron 1 waste iron fragment 10 whole nails 10 nail fragments 1 leather shoe sole--heel	6/4/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
9	Charcoal and slag	1 sprue	6/4/81	
	Mortar floor	1 flat metal fragment 1 nail fragment	6/4/81	
	Mortar surface	1 whole cut nail 1 spike fragment--tip	6/5/81	
	Charcoal and slag	1 cut nail fragment	6/5/81	
	Mortar surface	1 unidentifiable metal object--possible tool fragment--parallelogram cross section 3-3/4" in length 1 whole cut nail	6/9/81	
	Charcoal and slag	2 pieces of sheet iron 2 metal vessel fragments 1 wedge--3-3/4" in length 3 sprues--2 broken, 1 restored 1 small metal hook fragment 3 whole nails 3 nail fragments 1 whole spike 2 spike fragments	6/9/81	
	Mixed slag below mortar, above wood	2 flat metal fragments--1 thick, 1 thin 1 sprue 3 whole nails 1 spike fragment 2 waste iron fragments	6/10/81	
	Mixed slag below yellow mortar, above wood	2 possible metal vessel fragments 1 flat metal fragment 2 whole nails 1 spike fragment 1 waste iron fragment	6/11/81	
10	N100W10, purple shale in "road bed"	1 piece of sheet iron 1 wrought iron mold maker's slick 2 large flat metal fragments 1 small, thin flat metal fragment, possible strap 1 whole nail 7 nail fragments 3 whole spikes 3 spike fragments 1 red earthenware sherd--brown glaze--no decoration	4/28/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
10	N100W10 purple shale in "road bed"	1 red earthenware sherd--clear glaze--line indentation on non-glazed side 2 fragments of green-tinted window glass 2 fragments of dark green bottle glass 3 unidentifiable bone fragments	4/28/81	
	Compacted mottled yellow clay with slag	1 piece of sheet iron--one edge is folded over 3 nail fragments 1 spike fragment 3 waste iron fragments 2 red earthenware sherds--coarse--clear glaze--no decoration 3 buff earthenware sherds--one has brown Rockingham-type glaze--one has brown and white banding--one has clear glaze 4 white earthenware sherds--three have clear glaze and no decoration--one has blue and green banding--rim 8 porcelain or vitreous china sherds--clear glaze--1 rim, 1 base 1 porcelain sherd--blue glaze 1 white earthenware sherd--blue pearlware glaze--no decoration 8 fragments of green-tinted window glass	4/28/81	
	Red shale beneath road, above loose gravelly layer	1 firebrick fragment--writing on brick--"BRICK"--4 " in length	5/29/81	
	Loose gravelly layer	1 unidentifiable bone fragment 1 shell fragment	5/29/81	
11	N50E45, brown gravelly soil above red shale	2 flat metal fragments 1 possible metal "runner" 5 nail fragments 2 spike fragments--one is wrought iron 5 waste iron fragments 1 white earthenware sherd--clear glaze--no decoration	5/27/81	
	Red shale above yellow mortar	3 metal vessel fragments 3 flat metal fragments--1 thick, 2 thin 2 sprues 3 whole nails 6 nail fragments 7 spike fragments	5/27/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
11	Red shale above yellow mortar	1 waste iron fragment 2 white earthenware sherds--both have clear glaze--one has blue painted embossing, the other has no decoration	5/28/81	
	Mortar surface	1 U-shaped cylindrical metal rod 2 whole nails 4 nail fragments	5/29/81	
	Mortar floor	2 whole nails	6/4/81	
	Mortar surface	2 metal vessel fragments 1 possible metal strap--wrought iron 4 nail fragments 2 spike fragments 1 waste iron fragment 1 firebrick--writing on brick--"P...FIR..." 4-3/4" in length	6/5/81	
	Mortar surface	11 metal vessel fragments--one has earred lug 1 fragment wrought iron wrench for square headed nut 1 twisted cylindrical metal rod--wrought iron 2 whole nails 1 large waste iron fragment	6/5/81	
	Top of charcoal and slag	4 metal vessel fragments 1 wedge--4" in length 1 cast iron flask clamp--10" in length--two perpendicular sides to main body are 3-1/4" in length--object is rectangular in cross-section 1 nail fragment 2 waste iron fragments	6/5/81	
	Charcoal and slag	1 possible metal cold chisel--wrought iron 5-1/2" in length 1 metal fragment with edging-possible fireback or stove plate 1 unidentifiable thin metal fragment 3 unidentifiable metal objects--one is thin and curved--one is flat, thin, and 2-3/4" in length--third is square in cross-section at one end and rectangular at the other--wrought iron and 3-1/2" in length 1 whole nail 1 possible cut nail--wrought iron	6/9/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
11	Charcoal and slag	1 bolt--square head--3" in length 1 spike fragment	6/9/81	
	Charcoal and slag	1 charcoal sample	6/9/81	
	Charcoal and slag	1 slag sample	6/9/81	
	Slag over silty clay in race	1 piece of bar iron--8-1/2" in length--wrought iron 2 firebrick fragments--both about 4"in length--writing on bricks--"BE...PI... FIRI..." "'S...OF..."	6/18/81	
	Silty clay in race	1 possible metal vessel fragment 51 red earthenware sherds--17 have brown glaze, 1 base--11 have black glaze, glaze is thick--8 have brown and thick black glaze, 2 bases--15 are unglazed 1 white earthenware sherd--clear glaze--no decoration 2 fragments of green bottle glass-1 base which has a pointil scar is free blown--possible rectangular bottle	6/24/81	
	Slag over silty clay in race	1 metal vessel handle 2 wedge gates 1 small metal bar 1 possible pig fragment 1 cast iron object--L-shaped, 2 broken ends and 1 rounded end, gagger or core mold support 1 whole nail 1 whole spike--bent, wrought iron	6/18/81	
12	N60W5 over-burden	1 possible broken sprue--5-1/2" in length 1 wood sample from possible posthole	5/18/81	
	Red shale	1 stoneware sherd--blue painted--gray salt-glazed--possible jug handle	5/19/81	
	Brown gravelly soil with slag brick and charcoal	2 metal straps--both are wrought iron--one is "folded" on itself to form a circular shape--one is roughly L-shaped 4 pieces of sheet iron 3 unidentifiable metal objects--one is wrought iron 1 cylindrical metal rod--4-1/2" in length	5/19/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
12	Brown gravelly soil with slag, brick and charcoal	1 spike fragment--wrought iron 2 waste iron fragments 1 white earthenware sherd--clear glaze--no decoration	5/19/81	
	Clay level	2 metal straps--both are wrought iron--one is "folded" on itself at one end, 5-1/4" in length--one is circular in shape, outside diameter is 2", inside diameter is 1-3/4" 1 wedge--5-1/4" in length 1 unidentifiable metal object--flat on one side and rounded on the other--2-3/4" in length 1 spike fragment--wrought iron 1 waste iron fragment 1 red earthenware sherd--brown glaze--base	5/19/81 5/20/81	
	Clay with slag and charcoal	2 wedge gates 1 possible horseshoe fragment 1 spike--wrought iron	5/20/81	
	Red gravel	2 flat metal fragments--1 thick, 1 thin 2 possible metal handle fragments--one is triangular in cross section--one resembles a parallelogram in cross-section	5/20/81	
	Charcoal	2 large flat metal fragments	5/21/81	
	Charcoal below red gravel above slag	1 broken wedge--2-1/4" in length 1 metal file--4-3/4" in length 4 flat metal fragments 1 firebrick fragment--2-3/4" in length--glazed	5/21/81	
	Slag layer	1 piece of sheet iron 1 flat metal fragment 1 red earthenware sherd--brown glaze (lead)	5/21/81 5/22/81	
	Hard-packed	1 metal bar--3-1/4" in length--square in cross section 1 wrought iron object--6" in length--"paddle shaped" mold-maker's slick	5/22/81	
	Hard-packed red shale	1 large waste iron fragment	6/10/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
13	N30E15, slag layer	1 sprue 1 metal file--4-1/2" in length--wrought iron 2 flat metal fragments--one has edging 2 whole nails 2 nail fragments 1 possible spike fragment--wrought iron 2 waste iron fragments 1 piece of furnace glass	4/22/81	
	Gray-green clay with possible hammerslag	1 nail fragment	4/23/81	
	Slag layer	1 metal bar--wrought iron--11-1/2" in length square in cross section 1 metal leg--3" in length--triangular in cross section 1 large metal nut--2-1/2" x 2-1/2" square--threaded object broken off through center hold 3 flat metal fragments--2 have edging 1 possible metal strap 1 cast iron object--stove door plate and latch 3 spike fragments--2 are wrought iron 6 waste iron fragments	4/23/81	
	Slag layer	1 metal bar--4-1/4" in length--trapezoidal in cross section 1 horseshoe fragment 8 flat metal fragments--3 have rims--one has metal cylindrical rod extending from it 1 whole nail 3 nail fragments 2 waste iron fragments 1 red earthenware sherd--brown glaze--line indentation on non-glazed side	4/23/81	
	Slag layer	2 unidentifiable metal objects--one is three sided--2 sides are straight, 1 is rounded 3-1/2" in length, roughly triangular in cross section--one is roughtly wedge shaped, 4 flat sides, 4-3/4" in length	4/28/81	
14	N50E25 mortar floor of Feature 1	4 flat metal fragments--1 has rim--1 thick, 3 thin 2 nail fragments	5/29/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
14	N50E25, mortar floor of Feature 1	1 firebrick fragment--no writing 10 red earthenware sherds--all have brown glaze--5 decorated rims--2 have line indentations on non-glazed side 18 fragments of green-tinted window glass	5/29/81	
	Charcoal surface outside of Feature 1	2 pieces of sheet iron 2 unidentifiable metal objects--both are wrought iron--one is flat and rectangular in cross section 1 whole nail 7 nail fragments 1 spike fragments 2 waste iron fragments 33 fragments of green-tinted window glass	5/29/81	
	Dark gravelly clayey fill	1 whole nail 2 nail fragments 129 fragments of green-tinted window glass 38 fragments of clear window glass	6/3/81	
	Feature 41	1 large, thick, flat metal fragment--possible fireback 1 cylindrical metal rod--"O-shaped"--possible link--wrought iron 1 possible shutter pintle--wrought iron 10 whole nails 13 nail fragments 1 large spike fragment 13 fragments of green-tinted window glass	6/10/81	
	Slag and charcoal above and with stone over race	1 whole nail 1 nail fragment	6/17/81	
	Clay in race	2 wood samples (in 2 bags)	6/18/81	
	Silty clay	1 leather strap 1 wood sample	6/19/81	
15	N50E15, floor of Feature 1--yellow-brown sandy clay	8 pieces of sheet iron 4 whole nails 12 nail fragments 21 waste iron fragments--one covered with mortar 1 mortar sample--lime and sand mixture 2 shell fragments 6 red earthenware sherds--brown glaze--1 sherd has line indentation on non-glazed side	5/7/81	

ARCHEOLOGICAL SPECIMEN CATALOG

Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
15	N50E15, floor of Feature 1--yellow-brown sandy clay	19 fragments of green-tinted window glass	5/7/81	
	Black clay with brown gravel below	1 unidentifiable metal object--7" in length wrought iron--roughly shaped like a knife 7 whole nails 13 nail fragments 4 waste iron fragments 1 fragment of green-tinted window glass	5/7/81	
	Mixed charcoal with slag and brown gravelly soil	5 pieces of sheet iron 2 unidentifiable metal fragments--one is wrought iron and 4-1/4" in length--one is square in cross section and 2-1/4" in length 1 nail fragment 1 waste iron fragment	5/7/81	
	Slag layer	1 slag sample--very compact	5/7/81	
	Compact slag layer	1 possible metal handle--wrought iron--4-1/2" in length 2 whole nails 1 waste iron fragment 1 stoneware sherd, salt-glazed		
	Reddish-brown clayey soil beneath slag and stone	1 unidentifiable metal fragment--has screw or nail hole and rectangular notch 1 whole spike	7/1/81	
16	N40E25, charcoal and brown loam	1 waste iron fragment 8 fragments of green-tinted window glass 1 fragment of clear bottle glass	5/14/81	
	Reddish layer beween "hammer-scale" and charcoal and brown loam	1 possible metal vessel fragment 10 whole nails 3 nail fragments 3 spike fragments 1 possible spike fragment--wrought iron 1 shell fragment 5 fragments of green-tinted window glass 1 waste iron fragment	5/14/81	
	Charcoal-stained reddish soil over slag	1 nail fragment 2 spike fragments	5/17/81	

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16	Red shale, brown loam, charcoal, and pink clay--all above hard-packed slag	1 piece of sheet iron 2 cylindrical metal rods--both are wrought iron 1 flat metal fragment 2 possible metal vessel fragments 1 unidentifiable metal object--3-1/2" in length--triangular in cross section--pronounced grooving present 5 whole nails 6 nail fragments 1 clay pipe stem fragment 1 fragment of clear window glass	5/18/81 5/19/81	
	Compact slag-charcoal in northwest corner	1 wedge--5" in length--wrought iron 2 whole nails 3 nail fragments 1 waste iron fragment 1 fragment of green-tinted window glass	5/20/81	
	Slag with gray clay at base	2 whole nails 3 nail fragments	5/21/81	
	Charcoal, loam, slag, and red gravel	1 large cast iron metal object--has handle and rounded wrought iron knob--probable casting flask fragment 2 nail fragments 2 waste iron fragments	5/21/81	
	Gray clay	1 spike fragment	5/22/81	
	Gray clay in race	1 whole spike 1 red earthenware sherd--one side has clear glaze--one side has white slip design and clear glaze, causing it to appear black and yellow 1 piece of leather	5/28/81	
	Gray clay in race	6 whole nails 3 nail fragments	5/27/81	
	Gray clay in race	2 wood samples (in 2 bags)	5/27/81	
17	N90E10 red shale	1 sprue 1 unidentifiable metal fragment--irregular shape	6/1/81	
	Dark brown gravelly soil	2 possible metal vessel fragments 1 cold chisel--2-3/4" in length 1 mortar sample--lime and sand mixture	6/2/81	

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17	Red shale and clay	1 wedge gate	6/2/81	
	Mottled red clay with pockets of tan sandy silty clay	3 metal vessel fragments 1 possible metal vessel fragment 2 unidentifiable metal fragments 1 waste iron fragment 1 bone fragment	6/3/81	
	Found while cleaning unit for mapping	1 sprue 1 large unidentifiable metal object--has "hooks which are perpendicular to each other" (at seperate ends)--wrought iron	7/3/81	
18	N30W5, clay over slag	2 possible metal vessel fragments 7 pieces of sheet iron 4 whole nails 2 nail fragments 1 large waste iron fragment 1 stoneware sherd, salt-glazed--firing imperfection present on body 5 fragments of clear bottle glass	5/12/81	
	Slag in clay	1 possible metal vessel fragment 3 possible metal strap fragments 4 pieces of sheet iron 2 unidentifiable metal objects--one is small and wrought iron--one is rectangular in shape and has a beveled edge 10 nail fragments 2 spike fragments 1 waste iron fragment	5/12/81	
	Charcoal	1 metal strap--wrough iron	5/12/81	
	Yellow-green mottled clay with pockets of charcoal and patches of hard reddish gravel	1 wedge or chisel--wrought iron--5-1/2" in length 1 metal file fragment 1 metal strap 2 flat metal fragments--one is 5-1/4" in length 1 cast iron stove leg fragment 6 whole nails 8 nail fragments 2 spike fragments--both are wrought iron	5/13/81	

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18	All soils above yellow and gray clays	1 cast iron stove leg fragment 1 cast iron ornamental fragment 6 flat metal fragments--possible sheet iron 2 unidentifiable metal fragments--one is "crescent-shaped"--one is somewhat round 46 whole nails 205 nail fragments 7 spike fragments 8 waste iron fragments 1 red earthenware sherd--brown glaze--no decoration 1 fragment of clear bottle glass	5/13/81	
	Yellow clay	3 nail fragments 1 spike or punch fragment	5/14/81	
	Mottled clay	3 large pieces of sheet iron 1 wrought iron skein from tar skein axle--square hole at one end--14-3/4" in length--slightly curved 1 wedge gate 1 wedge or chisel--wrought iron--8" in length 1 spike fragment--wrought iron 1 red earthenware sherd--brown glaze--no decoration	5/14/81	
19	N50E35, brown gravelly soil with water-washed gravel	1 white earthenware sherd--clear glaze--hand painted floral design	5/28/81	
	Brown gravelly soil above charcoal and red shale	1 horseshoe fragment 3 whole nails 1 nail fragment 1 whole spike--wrought iron 1 stoneware sherd--salt-glazed	5/29/81	
	Charcoal layer above red shale	1 wedge gate 1 horseshoe fragment 2 metal vessel fragments 1 unidentifiable metal fragment--wrought iron 13 whole nails 31 nail fragments 3 spike fragments 4 fragments of green-tinted window glass	5/29/81	

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19	Red shale	1 waste iron fragment	5/29/81	
	Red shale above mortar floor	1 wedge gate 1 hammer head, blacksmith's side-set hammer	6/1/81	
	Trench in red shale	4 metal vessel fragments 1 metal strap--wrought iron 3 unidentifiable metal fragments--one is wrought iron and cylindrical--one is wrought iron and somewhat "wedge-shaped" 4 whole nails 2 nail fragments 6 waste iron fragments	6/1/81	
	Trench in red shale	4 metal vessel fragments 1 possible stove plate fragment 1 possible metal vessel fragment 1 flat metal fragment 1 sprue 1 metal strap--twisted--wrought iron 1 unidentifiable metal fragment--wrought iron 23 whole nails 36 nail fragments 7 spike fragments 6 waste iron fragments 1 red earthenware sherd--clear glaze--no decoration--rim 3 fragments of green-tinted window glass	6/1/81	
	Top of mortar	1 firebrick fragment--no writing--3-1/2" in length	6/2/81	
	Red shale over mortar	4 flat metal fragments--one is thick and rectangular in shape 1 wedge--3-1/4" in length 1 possible metal washer--outside diameter is 3"--inside diameter is 3/4" 1 unidentifiable metal object--triangular in cross section--has pronounced grooving on all three sides 1 chain link--wrought iron 1 piece of sheet iron 1 metal strap 2 iron bars--1 large, 1 small--both are wrought iron 11 whole nails 10 nail fragments 2 waste iron fragments	6/2/81	

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19	Top of mortar	1 metal nut--1-3/4" square--hole diameter is 3/4" 1 metal vessel fragment 1 metal strap 1 large metal bar--square in cross section, 5" in length 2 unidentifiable metal fragments 1 nail fragment 3 waste iron fragments	6/2/81	
	Top of mortar	1 metal bar--rectangular in cross section at one end--trapezoid in cross section at the other end--possible handle--6-3/4" in length 2 nail fragments	6/4/81	
	Top of charcoal and slag	6 metal vessel fragments--one has rim and handle 8 flat metal fragments--one is very large and one has a semi-circular notch 4 nail fragments--2 are wrought iron 3 waste iron fragments	6/5/81	
	Red shale above yellow mortar	1 large metal bar--wrought iron--rectangular in cross section--10-3/4" in length	6/10/81	
	Mixed slag below yellow mortar	1 piece of sheet iron 1 metal bar fragment--wrought iron 1 possible metal brace--wrought iron--shape is rectangular--has three holes--two of the holes are for screws (1 screw is still present) 2 unidentifiable metal objects--one is large and thick 3 whole nails 1 nail fragment 1 whole spike	6/10/81	
	Wood chip layer	5 whole nails	6/10/81	
	Wood chip layer	1 flat metal fragment 2 metal bar fragments 1 metal strip--folded on itself to form a circular shape 2 whole nails 1 nail fragment 1 waste iron fragment	6/11/81	

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19	Very hard slag	1 cold chisel--wrought iron--6" in length 1 piece of thick wire--wrought iron 1 metal strip fragment 1 unidentifiable metal object--wrought iron arched in center and curled up at ends 3 whole nails 1 firebrick fragment--writing on brick--"BER . . . REM . . ."--3-3/4" in length	6/12/81	
	Slag and charcoal with and over stones	1 metal vessel fragment 2 whole nails	6/17/81	
	Silty clay in race	1 copper gun powder flask with measuring top 1 flat metal fragment 1 nail fragment 2 pieces of leather 1 animal horn fragment	6/19/81	
	Silty clay in race	1 flat metal fragment 1 fragment of green (dark) bottle glass--neck 1 leather sample	6/23/81	
20	N50W5, red layer over slag and charcoal	1 wedge gate 1 sprue 1 wedge--4" in length 1 metal vessel fragment 1 flat metal fragment 1 large piece of sheet iron 3 metal strap fragments 1 flat metal bar--wrought iron--rectangular in cross section 1 cylindrical metal rod--wrought iron 3 nail fragments 2 whole spikes--both are wrought iron 3 spike fragments--all are wrought iron 3 waste iron fragments 1 stoneware sherd--salt-glazed--cobalt blue painted design--rim	5/13/81	
	Charcoal with slag	1 possible metal vessel fragment 2 metal straps 1 wedge gate 1 small wedge--1-3/4" in length 1 metal vessel fragment 1 metal file fragment 1 unidentifiable metal fragment	5/14/81	

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20	Charcoal with slag	3 whole nails 1 nail fragment 2 whole spikes--1 is wrought iron 4 spike fragments--3 are wrought iron 5 waste iron fragments	5/14/81	
	Hard-packed red shale with slag	1 metal bar--somewhat rectangular in cross section--4-1/2" in length 1 nail fragment 1 spike fragment	5/17/81	
	Brown loam and yellow clay	1 white earthenware sherd--clear glaze--blue transfer design 1 white porcelain sherd--clear glaze--blue hand-painted design--"Chinese export"	5/18/81	
	Red shale and slag chunks	1 metal vessel fragment 1 metal strap fragment--wrought iron 1 unidentifiable metal object--possible small wedge or tip from a longer tool 1 whole nail 5 nail fragments 2 spike fragments 1 red earthenware sherd--clear glaze--no decoration 1 piece of furnace glass	5/18/81	
	Below the red shale and slag	1 wedge gate 3 metal vessel fragments--one with tripod leg--wedge gate scar is present 1 spike fragment 1 waste iron fragment	5/20/81	
	Wall trench fill in north-west corner	1 red earthenware sherd--clear glaze--no decoration	5/21/81	
21	N80W10, over-burden	1 possible plow blade--has square hole near the curved blade	5/21/81	
	Dark gravel over charcoal lens	1 animal bone fragment	5/22/81	

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21	Dark gravel layer under wall in north-east corner	2 metal straps--copper fasteners present on both 1 thick metal rod fragment--cylindrical--"J-shaped"--wrought iron	5/25/81	
	Charcoal	1 fragment of olive-green bottle glass	5/25/81	
	Above and level with blacktop and road surface of old 806	1 pig iron fragment	6/10/81	
22	N40E5 "hammer-scale" clay	1 spike fragment--wrought iron	5/1/81	
	"Hammer-scale" clay	1 small metal strap--twisted 1 unidentifiable metal fragment--wrought iron--possible horseshoe fragment 3 waste iron fragments 6 fragments of clear plate glass--all fit together to form a circular shape--5 of the fragments have polished or ground edges.	5/1/81	
	Clay-lined shallow trench Feature 34	3 nail fragments	5/4/81	
	Gravelly brown loamy fill--Feature 35	1 flat metal fragment 1 nail fragment 4 spike fragments--3 are wrought iron	5/4/81	
	"Hammer-slag" clay	1 flat metal fragment--has rim 1 metal strip 2 whole nails 9 nail fragments 1 spike fragment 4 fragments of green-tinted window glass	5/4/81	
	Compact slag	1 wrought iron cold chisel, 5-1/2" long 3 whole nails 2 nail fragments 2 spike fragments--both are wrought iron	5/4/81	
	Mottled red clay with charcoal	2 unidentifiable metal objects--both are wrought iron--one is long and cylindrical-one is flat and rectangular in cross section at one end 2 nail fragments 1 whole spike 1 spike fragment	5/5/81	

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22	Light brown sandy clay	2 wedge gates--one is broken 1 waste iron fragment 7 red earthernware sherds--brown glaze--no decoration	5/7/81	
23	N70W10 charcoal layer	1 charcoal sample	5/7/81	
	Red shale	3 nail fragments 1 stoneware sherd--clear glaze--firing imperfection present on body	5/17/81	
24	N80E10, skim of red clay	1 whole spike	6/10/81	
	Gravelly brown slightly clayey loam	2 whole spikes	6/10/81	
	Disturbed dark fill over stones lining posthole	1 possible metal vessel fragment	6/10/81	
	Quartz pebbles of Auburn Road	1 flat metal fragment 1 piece of barbed wire 4 nail fragments 1 whole spike 3 spike fragments 1 porcelain sherd--clear glaze--no decoration	6/11/81	
	Red shale/charcoal below Auburn Road	1 whole spike	6/11/81	
	Within posthole fill	3 unidentifiable metal fragments--2 are copper with distinctive ridging--both are 2-1/4" in length--other fragment is a small metal bar which widens into a circle at one end--circle has hole through it--2-3/4" in length	6/11/81	
	Next to Feature 4 wall in Trench 3	1 cast iron object--roughly "L-shaped"--square in cross section--10-3/4" in length (long side)--2-1/2" in length (short side) broken flask clamp	7/3/81	

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25	N100E0 1979-81 backdirt--probably from red clay and shale at level of Feature 4	1 wedge gate 1 whole spike 2 waste iron fragments	6/2/81	
	1979-81 backdirt	1 wedge gate 2 sprues 1 waste iron fragment	6/2/81	
	Driveway surface--light yellow shale	3 red earthenware sherds--all have clear glaze--1 rim, which has glaze on both sides, is 1-1/4" wide	6/3/81	
	Dark gray-grown cindery ashy gravel with stone and slag--Feature 31	1 flat metal fragment 1 whole nail 17 waste iron fragments	6/3/81	
	Robbed wall trench	1 possible broken sprue	6/4/81	
	Brown clayey loam with rocks	1 whole spike 2 spike fragments 2 waste iron fragments 1 fragment of green-tinted bottle glass	6/5/81	
	Layers above brown gravelly and yellow clay spread over Feature 31	1 Indian Head penny--1877	6/5/81	
	Gravel and sand layers over charcoal	1 possible pig iron fragment 1 small metal bar--curled at one end to form a hook--wrought iron 2 metal straps--both are wrought iron 1 unidentifiable metal fragment 2 spike fragments 1 white earthenware sherd--clear glaze--no decoration 1 animal bone fragment	6/5/81	
	Brown sand at south of trench	1 unidentifiable metal fragment--wrought iron	6/9/81	

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25	Hard-packed purple shale	1 metal strap--wrought iron 2 waste iron fragments	6/9/81	
	Surface of red shale/charcoal layer	3 pieces of sheet iron 1 cast iron object--roughly square in shape reddened on one side--has the number 3 on one flat side, possible stove part. 1 whole nail 1 nail fragment 1 whole spike 2 spike fragments	6/9/81	
26	N40E35, "hammer-scale" clay	1 unidentifiable metal fragment	5/29/81	
	Brown gravelly loam	1 metal strap fragment 11 unidentifiable metal fragments 1 fragment cast iron runner 2 whole nails 3 nail fragments	6/1/81	
	Red shale above slag and stone	1 possible clamp or "pinch"--wrought iron--roughly "U-shaped" 1 whole nail	6/1/81	
	Red shale and slag	1 conical sprue 6 flat metal fragments 2 wedges--one is broken and 3-3/4" in length the other is 3" in length 1 possible metal vessel fragment 2 unidentifiable metal objects--one is shaped like a screwdriver--wrought iron--one is triangular in cross section 5 whole nails 8 nail fragments 1 spike fragment 2 waste iron fragments	6/2/81	
	Top of charcoal and slag	1 possible metal vessel fragment 1 nail fragment	6/5/81	
	Loose slag above wood chips	1 sprue 1 tripod leg 1 metal file fragment 1 metal strap 1 large bolt--has butterfly nut attached to it, stove bolt 1 possible metal "pot stand"--"leg" is wrought iron--"body is cast iron--leg and body are held together by 2 rivets	6/10/81	

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26	Loose slag above wood chips	1 flat metal fragment--has rim which is slightly curved 1 metal bar--wrought iron--square in cross section 1 metal rod--cylindrical 1 whole nail 2 nail fragments 4 whole spikes--1 large 2 waste iron fragments 1 fragment of green-tinted bottle glass--neck and rim	6/10/81	
	Loose slag above wood chips	1 possible metal "pot stand"--cast iron 1 possible metal vessel fragment 1 possible piece of sheet iron--cut 3 unidentifiable metal fragments--1 thick 2 whole nails 1 spike fragment	6/10/81	
	Wood chip layer	2 wood samples (in 2 bags)	6/10/81	
	Wood chip layer	2 whole nails 3 whole spikes	6/10/81	
	Below yellow mortar	1 wood sample--plank	6/10/81	
	Wood chip layer	2 spike fragments	6/11/81	
	Hard slag beneath wood chip layer and above gray clay	1 wedge gate 2 flat metal fragments--one reddened 1 cold chisel--wrought iron, 5" long 1 unidentifiable metal fragment--conical shape 1 whole nail	6/11/81	
	Blue slag over gray clay and rocks	1 slag sample	6/11/81	
	Hard slag above red and gray clay	1 large metal bar fragment--reddened--rectangular in cross section 2 flat metal fragments--one reddened 1 metal strap--wrought iron 1 metal strip--wrought iron 1 whole nail 1 leather strap	6/12/81	

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26	Slag over silty clay	6 flat metal fragments--1 thick 1 wedge gate 2 metal bar fragments--one is thin and rectangular in cross section--one is reddened and rectangular in cross section 1 waste iron fragment	6/18/81	
	Slag over rubble embankment south of race	1 piece of sheet iron--curved 1 whole nail 1 nail fragment 1 whole spike 1 fragment of green bottle glass	6/18/81	
	Charcoal and slag over race	1 large flat metal fragment--reddened--thick	7/3/81	
27	N20W5 brown loam over red shale and charcoal	1 flat metal fragment 1 whole nail 1 waste iron fragment 2 fragments of clear window-glass--thick	5/15/81	
	Red shale with slag in southwest corner of unit	1 sprue	5/17/81	
	Gray-brown silty clay in slot cut into red clay	1 spike fragment 1 white earthenware sherd--clear glaze--no decoration--rim	5/18/81 5/19/81	
	Gray clay below charcoal	1 flat metal fragment 1 waste iron fragment	5/19/81	
	Hard brown gravelly sand in central trough	1 white earthenware sherd--clear glaze--no decoration	5/19/81	
	Brown-green silty clay with slag	3 metal strip fragments 1 whole spike 3 waste iron fragments 1 red earthenware sherd--clear glaze--line indentation on non-glazed side		
	Hard pinkish mottled clay	1 unidentifiable metal object--resembles waste iron--has notch and three holes through it--two of the holes are filled, one is not 1 spike fragment--wrought iron	5/26/81	

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28	N15, trench very hard packed mottled surface	1 fragment of green bottle glass	5/6/81	
	red shalely soil above charcoal and slag and above yellow clay	1 possible broken sprue 1 flat metal fragment--has rim 1 metal rod--cylindrical--wrought iron 2 nail fragments 1 whole spike 2 waste iron fragments 2 porcelain sherds--clear glaze--no decoration 1 white earthenware sherd--clear glaze--no decoration	5/6/81	
	Gray sandy clay under charcoal and slag	1 possible metal vessel fragment	5/6/81	
29	N110E0, layer of mixed clay and rubble over red purple shale with slag and brick	1 whole nail 1 waste iron fragment 1 red earthenware sherd--clear glaze--no decoration--base 5 fragments of green bottle glass	6/3/81	
30	N90E5, 1979 backdirt	1 cast iron trunion or handle attachment from a large hollowware vessel	5/26/81	
31	N70E0, blacktop over road stones and loam beside it	5 whole nails 1 bolt fragment	6/10/81	
	Ashy dark gravel	1 unidentifiable metal fragment 1 piece of wire 3 nail fragments 1 spike fragment 5 waste iron fragments	6/12/81	
	Gray-brown loam with patches of red shale and charcoal	1 large unidentifiable metal object--circular in shape--has hole through center--outside diameter is 3-1/2"--hole diameter is 1"--object is 1" thick	6/12/81	

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31	Remnants of the slag and charcoal layer	1 unidentifiable metal object--triangular in cross section 1 flat metal fragment 1 spike fragment--wrought iron 3 waste iron fragments	7/1/81	
	Red clayey layer mixed with charcoal	1 metal hook--cylindrical--wrought iron 2 waste iron fragments	7/1/81	
	Reddish-brown clayey soil	1 red earthenware sherd--clear glaze--no decoration	7/2/81	
32	N40W5 "hammer-scale" layer	1 unidentifiable metal fragment--wrought iron--"L-shaped" 1 whole nail 1 whole spike 1 porcelain sherd--clear glaze--hand-painted "Chinese export"	5/11/81	
	Beneath slag--beside red red shale--on top of clay--in trench	1 nail fragment	5/12/81	
	Gray-green brown loam over rocks in wall trench	1 possible metal vessel fragment 1 earred lug 1 nail fragment 2 spike fragments--wrought iron 1 red earthenware sherd--clear glaze--no decoration 1 fragment of green bottle glass	5/12/81	
	Slag and charcoal	1 wedge gate 1 possible sprue fragment 1 possible metal pipe 1 metal vessel rim 2 flat metal fragments--one has rim 2 possible metal vessel fragments 1 metal rod--cylindrical--wrought iron 2 metal bars--both are wrought iron and rectangular in cross section--one is thick and curled up at one end 1 unidentifiable metal fragment--square in cross section--wrought iron which is "twisted" 13 whole nails 9 nail fragments 5 spike fragments 6 waste iron fragments	5/12/81	

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32	Clay with some slag over yellowish clay beside red shale	1 wedge gate 1 unidentifiable metal object--shaped like a screwdriver--wrought iron 3 nail fragments 2 spike fragments 1 red earthenware sherd--clear glaze--no decoration 1 fragment of green-tinted window glass	5/13/81	
	Hard-packed red shale with slag	4 nail fragments	5/21/81	
33	N40E15, wood samples	3 wood samples--in 3 bags	5/8/81	
	Silty clay in race	4 whole spikes) all from wood beam 1 spike fragment) 3 wood samples in 3 bags	5/8/81	
	N40E15 and N40E5	1 wood sample	5/8/81	
	N40E5	1 wood sample	5/8/81	
	N40E25, compact wood and ash layer	1 wood sample	5/25/81	
	N30E15	1 wood sample	5/8/81	
	N50E25	2 wood samples--one has wooden peg	6/18/81	
	N110W10, 10 YR 3/2, very dark grayish-brown gravelly loam with brick and charcoal	1 whole nail 4 nail fragments 23 waste iron fragments 1 mortar sample--lime and sand mixture 1 red earthenware sherd--brown glaze--no decoration 2 fragments of green bottle glass 1 piece of furnace glass	4/21/81	
	5 YR 3/2, dark reddish-brown sandy loam with slag and charcoal	1 metal vessel fragment	4/21/81	

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34	5 YR 3/2, dark reddish-brown sandy loam with slag and charcoal	1 piece of sheet iron 1 flat metal fragment 4 whole nails 4 nail fragments 13 waste iron fragments 3 pieces of furnace glass	4/22/81	
35	N80E35, recent slag fill below yellow sandy clay	2 shutter pintle fragments 1 metal vessel leg--triangular in cross section 1 piece of sheet iron 1 metal strap 1 metal rod--cylindrical--wrought iron 2 metal bars--both are wrought iron--one is small and bent over on itself--one is slightly curved 1 unidentifiable metal fragment--slightly curved--rounded on one end 10 whole nails 1 nail fragment 1 whole spike--wrought iron 14 white earthenware sherds--clear glaze--no decoration--5 are severely stained--5 rims--2 bases 1 buff earthenware sherd--clear lead glaze--green painted design 2 fragments of clear bottle glass--one is base and 2 sides of a bottle 1 fragment of a clear glass object--base and handle present 2 fragments of green-tinted window glass 4 fragments of aqua bottle glass 1 fragment of green bottle glass 2 fragments of brown bottle glass 2 pieces of rubber	6/24/81	
	Interface of yellow clay and recent slag fill	1 metal gutter support 1 metal spoon handle--initials on handle either "EL" or "ET" 1 whole nail 1 white earthenware sherd--clear glaze--no decoration 6 fragments of clear bottle glass--1 base 5 fragments of aqua bottle glass--2 bases 21 fragments of brown bottle glass--1 neck and rim--1 base	6/24/81	
	Red shale beneath twentieth century slag	1 unidentifiable flat metal fragment 2 pieces of a tin can--one has can opener holes in it	6/25/81	

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Site number: 18FR320

Division of Archeology, Maryland Geological Survey

Name of site: Catoctin

County: Frederick

Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
35	Red shale beneath twentieth century slag	1 porcelain sherd--clear glaze--rim--raised decoration around rim 4 fragments of brown bottle glass--1 base	6/25/81	
	Light brown soft loamy soil beneath twentieth century slag	1 possible sprue 1 horseshoe fragment 2 unidentifiable metal fragments 1 fragment of green-tinted window glass 5 fragments of aqua bottle glass--2 bases--1 neck and rim 1 whole "BROMO-SELTZER" bottle--dark blue--additional writing-- "EMERSON DRUG CO. BALTIMORE"--number "10" on bottle base 1 fragment of green bottle glass 2 fragments of brown bottle glass 1 piece of rubber	6/25/81	
	Charcoal and slag below light brown loam	1 wedge--3-1/4" in length 1 metal bar--rectangular in cross section--7" in length 1 metal hook--possible flask hook--has "pivot" still attached to it at one end 3 possible metal vessel fragments 1 unidentifiable metal object--6-1/2" in length 1 nail fragment 3 waste iron fragments	6/25/81	
	Charcoal and slag under medium brown loamy soil	1 metal runner from casting multiple number of objects 3 possible metal vessel fragments 2 metal rods--cylindrical 1 metal bar--triangular in cross section 1 metal strap--one end comes to a point--curved 1 piece of sheet iron--cut to form two perpendicular sides 5 flat metal fragments 3 unidentifiable metal fragments--one is a rectangular-shaped object with one notched side--one is trapezoidal in cross section 3 whole nails--1 large 3 nail fragments 2 spike fragments 9 waste iron fragments 1 red earthenware sherd--brown glaze--no decoration	6/29/81	

ARCHEOLOGICAL SPECIMEN CATALOG

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35	Reddish-brown clay with slag beneath charcoal and slag	2 metal vessel fragments--one is possible base 1 flat metal fragment 1 whole nail 4 waste iron fragments 2 red earthenware sherds--dark opaque glaze--no decoration	6/30/81	
	Yellow-brown mortar surface south of stone wall	1 flat metal fragment 1 whole nail 2 nail fragments 1 spike fragment--wrought iron 2 waste iron fragments	7/1/81	
	Reddish-brown clayey soil with some slag overlying light brown thin mortar surface south of stone wall	2 unidentifiable metal fragments--one is roughly triangular in shape--one is slightly curved 1 nail fragment	7/1/81	
	Reddish-brown clay beneath mortar surface south of stone wall	2 possible metal vessel fragments 3 flat metal fragments 1 unidentifiable metal fragment 3 nail fragments 1 spike fragment 8 waste iron fragments	7/2/81	
36	N70E10, brown gravelly soil beneath yellow-brown and above purple shale	1 metal strap--3-3/4" in length 1 spike fragment	6/16/81	
	Purple shale with charcoal	2 sprue fragments 1 flat metal fragment 2 pieces of wire--one folded on itself 9 whole nails 2 nail fragments 1 whole spike 2 spike fragments 2 waste iron fragments	6/16/81	

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
36	Purple shale above charcoal	1 possible metal vessel fragment 1 whole nail 1 nail fragment 1 spike fragment 1 waste iron fragment 1 white earthenware sherd--clear glaze--no decoration	6/17/81	
	Slag and charcoal beneath purple shale above red clayey shale	1 sprue 1 possible metal vessel fragment 3 nail fragments 2 pieces of slag--both have brick impressions on them 1 unidentifiable object--possible slag--has possible flow lines--5-1/2" in length	6/17/81	
	Charcoal and slag over red clay/shale	1 flat metal fragment 1 small metal bar--wrought iron--5-3/4" in length 1 unidentifiable metal fragment--roughly triangular in shape	6/18/81	
	Charcoal and slag over red clay	1 unidentifiable metal fragment 2 spike fragments	6/19/81	
	Red clayey soil with small amount of shale below charcoal and slag	1 metal handle 6 metal vessel fragments 1 unidentifiable metal fragment	6/25/81	
	Top surface of red clayey soil beneath charcoal	2 wedge gates 1 possible metal handle--small, cylindrical and slightly curved 2 possible metal vessel fragments 1 metal "blob"--wrought iron 1 white earthenware sherd--clear glaze--no decoration--possible rim	6/29/81	
	Red clayey soil in narrow test trench along north side of square	1 metal vessel fragment	6/29/81	

ARCHEOLOGICAL SPECIMEN CATALOG

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Lot Number	Provenience	Description (and old number)	Date Collected	Collector and/or Donor
37	N60E45, charcoal and slag above red shale and above level of mortar floor (from backhoe)	1 broken machine gear wheel--has distinctive teeth along one side--slightly curved on one other side--rectangular in shape, remains of runner still attached 1 cast iron object--circular in shape--has hole through center--outside diameter is 3-1/2"--inside diameter is 2-1/2" at one end--inside diameter is 2" at other end--rectangular projection from one end of the object is 1" in length--wagon box.	no date	

[✓] DRAFT [] FINAL

[✓] RECEIVED (Date 22 July 82)

[] TRANSMITTAL LETTER (To Tyler)

[] BIBLIOGRAPHY FORM COMPLETED

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